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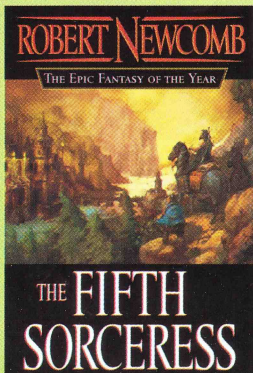
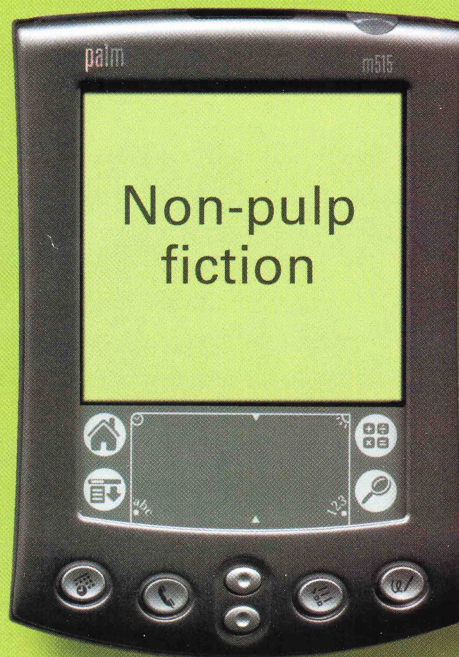
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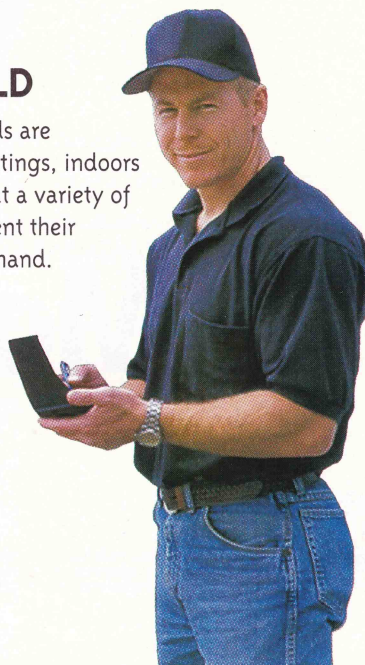
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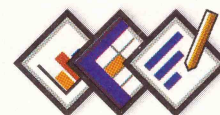
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Staying on the Cutting Edge?

The Clie NR70V. The m130. The Treo. So many hot new handhelds to choose from. But have you checked out the 2001 Handspring Visor?

What? The Visor? But didn't Handspring say its future was the Treo Communicator? Isn't the Springboard a dead-end expansion technology, given its size and the Visor's cloudy future? Aren't tiny SD cards and Memory Sticks the future of handheld expansion?

The answer to all of these questions is "yes." But are you buying a handheld to use in 2003, or to use now? While the Visor's future is a bit muddled, the platform has already achieved enough add-on support to keep it interesting for quite a while. There are about 70 different Springboards available now, with an amazingly wide range of capabilities. They can turn a Visor into an MP3 player, GPS, cell phone, voice recorder, bar code reader—even a muscle massager. Compare this to Memory Stick and SD—you can currently count all the different types of cards for those relatively new expansion technologies on one hand. And when those technologies do see better support—and they will—just pop in a MemPlug Springboard and a Visor will happily accept those cards.

Along with variety, there's savings. At press time, available deals included a refurbished Visor Prism from Handspring.com for only \$229—half the price I paid for mine—and Innogear was selling 32MB MiniJam MP3 players for a mere \$79. While it's not great for Handspring that slimline Visor Edges are selling new for under \$200, it's great for folks looking for a first handheld or an upgrade device.

Now, I'm not knocking the cutting edge handhelds. After all, I've spent many hours trying to come up with a decent spousal rationalization for how I could justify buying a Clie NR70V when we have our first baby on the way. But in a market where the latest and greatest gets the lion's

share of the attention, you shouldn't overlook the deals available on last year's hottest hardware.

WHERE'S THE WIRELESS?

Speaking of retro handhelds, I've been carrying my Kyocera QCP6035 (affectionately called "the brick" by some of our marketing staffers) more than any other lately. Even though it's the technical equivalent of a Technological Paleolithic Era Palm IIIx, the ability to check my email or do a quick web lookup no matter where I am is so useful to me that it outweighs the bells and whistles on the other handhelds in my office.

As sold as I am on the utility of wireless handhelds, I'm continuously surprised by the lack of wireless support in the North American market for Sony's high-end Clie models. Sony released its Mylo wireless modem, but only for its low-end S320 and S360 models—and with little fanfare. Sony created a Bluetooth Memory Stick, but it's only available in Japan. Sony's obviously not afraid of being on the cutting edge; the new NR70 series reviewed in this issue's cover story is evidence of that. So why is it that Sony offers the only major Palm Powered platform without Bluetooth, 802.11b, and other wireless options? Of course, you can connect a digital cell phone to the Clie, but that's so late 20th Century. We hope to see Sony jump on the wireless bandwagon soon. In the meantime, we'll have to stick with plugging our cell phones into our Clies...

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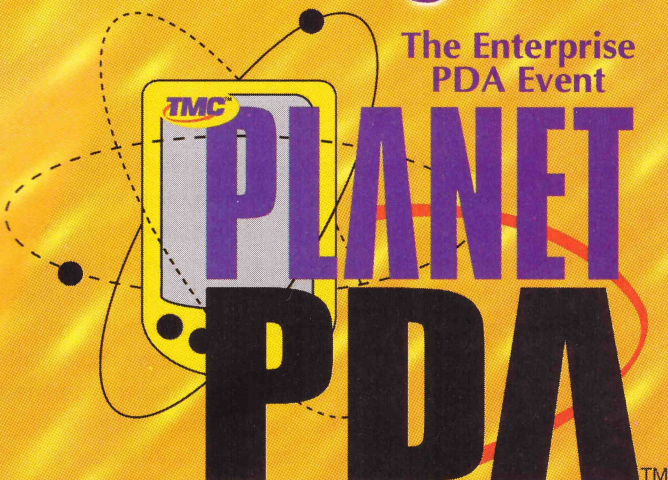
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— Bob Donovan, CVO, Best Solutions Inc.

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WHITHER WIRELESS?

In a recent edition of Handheld Computing Weekly (subscribe for free at www.hhcmag.com!), we asked our readers whether they thought wireless was an important feature for handhelds, and which wireless technologies they found most appealing. We've spent lots of space talking about the upsides of wireless. Some folks say they're still waiting to make the leap to wireless; what follows in these letters are some of the downsides of current technology.

While I was driving today, I had to make a couple of calls. I had to check the phone number on my PDA (Handspring Prism), and then I highlighted the number I wanted to reach, and just very naturally put the Prism to my ear. Of course, I then had to unhook my cell phone from my belt (below the seat belt), punch in the phone number (turning the Prism on again to get the number) and then make the call.

At that point I said to myself, "I need to upgrade to a Treo or equivalent as soon as the price is reasonable."

—Vik Savara

In response to your recent query, I can say that I am not planning on going "wireless" in the near future because the monthly subscription cost is simply not worth the small incremental gain in productivity.

On the other hand, I am anxiously awaiting an 802.11b MMC Card for my Palm m505 so I can walk into work, home, coffee shops, etc and have instant access to the Internet (including email and such).

—Ed Glantz

I have a Handspring Neo and a Palm VII. The Handspring Neo with a ThinComm land-line modem is the unit I travel with. Why? Because the coverage for the Palm VII (although respectable for a digital service) is still spotty and too unreliable. It may take longer to set up the modem connection (physical setup and finding a local access number), but its success rate is near 100%. E-mail is too important to me when I'm on the road. Wireless service has got a long way to go before I can trust it across the USA.

—Thomas McCormick

So far, I have not been very impressed with the "communicators" that are hitting the market. With Bluetooth finally becoming available for the m-Series Palm handhelds, I am just as excited about using Bluetooth to connect to my cell phone. I like having a small cell phone, as opposed to a Palm/phone combo, which adds bulk to both. In my book, the smaller, the better. The Palm m500 series is a perfect size for a PDA, and I wouldn't want it to be much bigger. Until someone comes out with a "communicator" that has the size and expandability of the m500 series, with the 65,000 color, high resolution of the Clie, and is also a cell phone, then I'll just be happy with Bluetooth. Besides, Bluetooth has more uses than just connecting to a cell phone.

—Sean D. Evans

President, Canada's Premier PalmOS User Group
www.canadapug.com

I'd love to have a wireless Palm device. I have a few things holding me back.

I live in a rural area and cannot get wireless data service in my area. I do sometimes connect my Palm IIIc to my cell phone for occasional access, and Bluetooth equipped devices would make that much easier.

What I'd like is a combo phone/palm with a 320x320 color screen, 64 MB RAM, and an integrated headset. MP3 and voice recorder features would be a major plus.

I probably have a year's wait till I see it, but as soon as it's available I'll buy one. Oh, did I mention I wouldn't want to pay more than \$500?

—Martyn 'Bhupesh' Arnold

I have craved going wireless with my Visor Deluxe for two years. I just cannot justify the cost when I can use my modem module with the Earthlink account I already have. If services dropped down to around \$15 a month for unlimited service, I would probably break down and get a module and a service package.

—Rob

WIRELESS NOW

Granted, I will surely be one of the more "fringe" practitioners, but here's my 2 cents worth. I completely gave up desktops quite some time ago.

They never suited my nomadic lifestyle and political activism. I am completely converted to handheld, wireless now. I started out with a RIM 950 Blackberry. After about a year I upgraded to the larger screen 957 Blackberry, which I love.

Some time back I also bought a Handera 330, which nicely compliments my Blackberry. I use it for more extensive text entry and storage. I got a Symbol Technologies 802.11b compact flash card for it. The reason I got the 330 was I liked the higher resolution screen, the digital recorder, and the two expansion slots. This handheld is very well designed, and I unreservedly recommend it. I also have a 64MB SD card in its other port. I also have the the Palm Portable Keyboard which folds to about the size of the Blackberry when collapsed.

I've found a few cafes where I can use Symbol Wi-Fi card for web browsing. And that sucker flies! I tried using Blazer, but many 802.11b setups don't

allow browsers that require proxy servers, so I switched to EudoraWeb.

As far as the phone goes, I'm checking over those this year. I expect that I may get a Bluetooth-enabled phone and another card for my Handera.

I'm very happy giving up my desktop. Now, I've just got to figure out how to light a fire under the AvantGo people!! I want to be able to update my channels from the cafe using 802.11b on my Handera. And I don't think anyone is ever going to devise a better portable email implementation than the Blackberry!

—Jon Anderson

Thanks for the feedback, Jon. You might be surprised, though, at how well a thumbpad-equipped i705, or a Treo running Handspring's Treo Mail, can give the Blackberry a run for the money!




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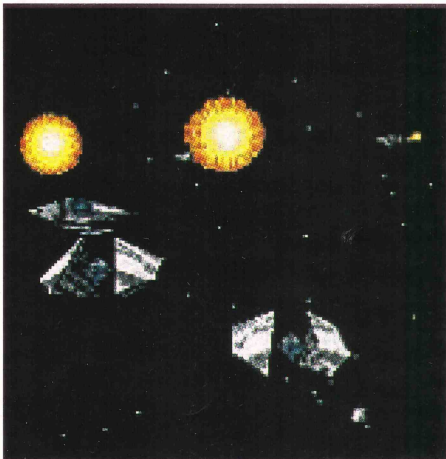
Sega's Got (Palm) Game

At the recent PalmSource Japan Forum in Tokyo, Sega Corporation showed a number of prototype games for next-generation Palm Powered devices. Created with a special version of Metrowerks' CodeWarrior tools and operating on a prototype board running Motorola's ARM-based Dragonball MX1 chip, the software on display included a 3D graphics demo and two puzzle games.

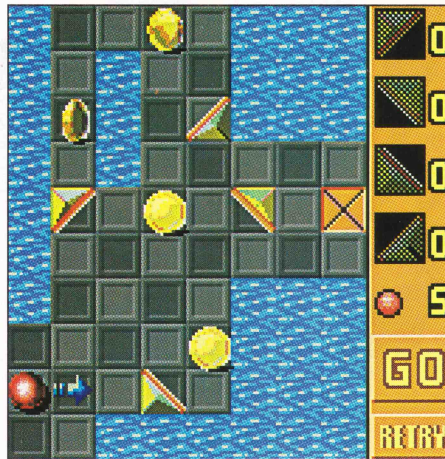
The two puzzle games, Borkov and Triangle Magic, were available for free download between March 28th and April 30 on the site pda.sega.co.jp. (While they were designed to show off the speed of

ARM chips, they run fine on today's standard 68K-series Dragonball chips.) Interestingly, they were sluggish but playable on a 33MHz Palm m130, but they were silky smooth on Sony's new 66MHz NR70V despite its lack of ARM power.

Metrowerks said that Sega will be licensing its mobile games API for inclusion in the next generation of the CodeWarrior IDE that will target next-generation Palm Powered handhelds. The company is confident that this development combination will result in a wealth of new games for the next-generation Palm platform.



A 3D Space scene from Sega's graphics demo.



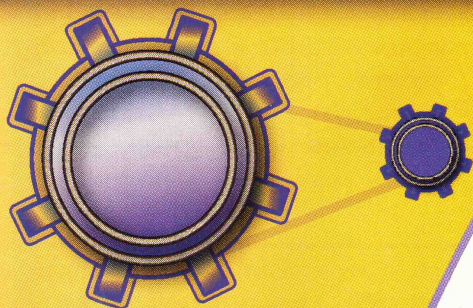
Triangle Magic, one of the first games developed with Sega's new gaming API. A 3D Space scene from Sega's graphics demo.



The more action-oriented Borkov needs at least a 66MHz CPU to run smoothly.

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Copytalk i705 Beta

Copytalk announced in early April that it had started an open beta test of service for the Palm i705. i705 users call Copytalk's toll-free number and dictate contacts, appointments, to-dos, expenses, or email. Copytalk transcribes the dictation and notifies the i705, which then retrieves the information wirelessly from Copytalk.

Palm Web Browser

Perhaps noting the irony that one of the best web browsers for the Palm OS was competitor Handspring's Blazer, Palm has released its own web browser. Called the Palm Web Browser (the marketing department must have called in sick that day), this browser offers full HTML support, categorized bookmarking, the ability to save information for offline viewing, and a cached history of visited sites. The software will cost \$19.95.



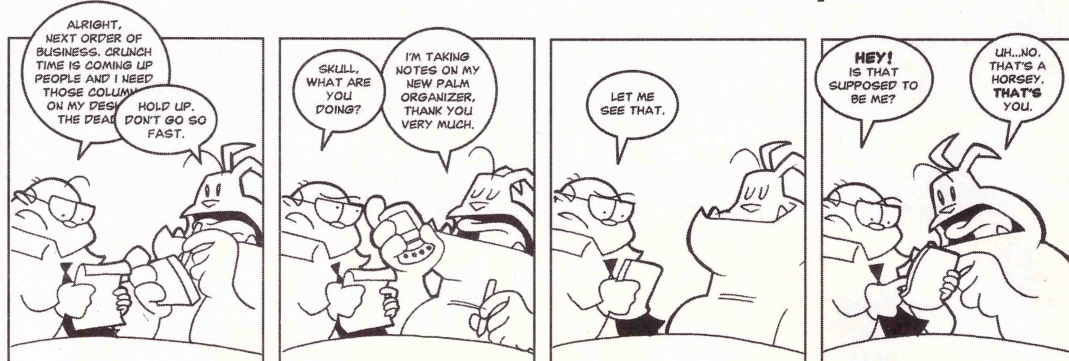
Palm Web Browser

Noted Comic

Author Snaps with Visor

One of today's hottest comic writers, Warren Ellis, is apparently a Handspring Visor fan as well. Lest anyone tells you that the eyemodule digital camera Springboard is too

continued



See more PVP online at, appropriately enough, www.pvponline.com

InkLink: the SmartPad Gets Small

Seiko Instrument's USA's SmartPads are an ingenious idea. You can sketch on a sheet of real paper, and the SmartPad transcribes your drawings and writing into graphics which are stored on your Palm Powered handheld. The technology has one major downside, though: size. You have to bring along a full-sized notebook containing the SmartPad and its paper—hardly a "palm" solution.

Seiko has solved this problem with the InkLink, a small device that can be used with any size paper up to Legal (8.5x14 inches). The InkLink fits in a carrying case that measures just 7.6x2.9x1.4 inches and weighs just 4.75 ounces—small enough for a purse or coat pocket. The carrying case holds the InkLink Electronic Ballpoint Pen, Data Clip, and the IrDA transceiver that communicates with your handheld.

InkLink and its InkNote Manager software will work on both Palm OS and Pocket PC handhelds. The device can also attach to a desktop or notebook PC running Windows. The product costs \$99.95. For more information, visit www.seikosmart.com.



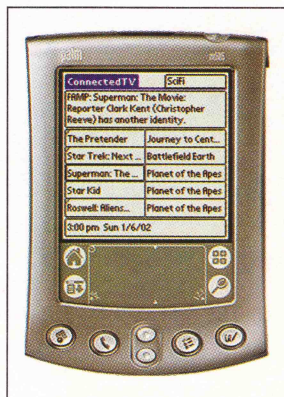
InkLink can attach to a single sheet of paper or a writing pad.

ConnectedTV Puts an End to Channel Surfing

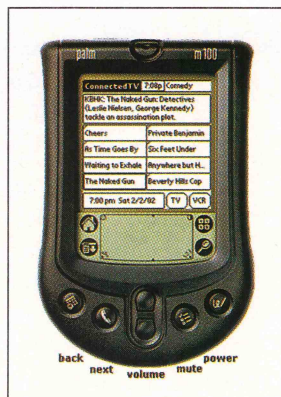
ConnectMedia's ConnectedTV turns your handheld into a interactive, handheld television program guide. When you HotSync your handheld, ConnectedTV will download the latest program listings from the Internet. When you want to change the channel, just tap on the program you want to watch using your fingertip. The handheld's IR transmitter will change the channel. No more remembering what channel a program is on, or dealing with terribly designed digital cable channel guides.

In addition, ConnectedTV lets you filter selections to make finding a particular program easier. For instance, you could pull up all the listed shows in the Sci-Fi category, or search for kids' programs. You can also bring up episode descriptions for many programs.

Controls such as mute and volume up/down can be mapped to the handheld's hardware buttons and the Sony Clie jog dial, allowing you to easily made adjustments without looking at the screen. ConnectedTV supports a wide variety of devices, including televisions, cable and satellite boxes, VCRs,



ConnectedTV lets you search for programs by category.



It might just be worth buying a sub-\$100 m100 just to run ConnectedTV.

and TiVos. ConnectedTV says the remote transmitter will work from across the room on most Palm, Handspring, and Sony models, and it will take advantage of the enhanced IR transmitter on newer Clie models.

The service will be priced at \$30 per year. Even if you bought a Palm m100 to use as a dedicated remote control, you'd save quite a bit compared to a dedicated LCD remote like the \$300+ Philips Pronto.

For more information, visit www.connected.tv.

BLURBS

low-resolution to be a useful digital camera, check out the artistic compositions by *Transmetropolitan* author Ellis at www.strangemachine.com. Our favorite is "Lilith in Motion."

Palm OS 5.0

Set for June Launch

PalmSource has announced that it expects to ship the final version of Palm OS 5.0, the first version to run on ARM processors, this June. The company didn't state when the first ARM devices would ship from its licensees, but we expect it will take at least a couple of months to test and integrate the new OS with next-generation hardware.

Air Palm

We don't know how we missed this hot breaking news, but hot on the expensive designer heels of the Claudia Schiffer Palm V comes the The Michael Jordan Edition Palm Handheld Computers. These special versions of the Palm m100 and m500 include a special Michael Jordan software bundle, including MJ Speaks, MJ Trivia, Blackjack, Total Car MJ, a guide to Michal's restaurants, and more. The MJ m500 (so popular it was on backorder as we wrote this) also includes the Michael Jordan Certificate of Authenticity. We joke, but if you're in the market for one of these handhelds, the prices are about the same as the regular models and they do come with an interesting software bundle. Check them out at www.jordanedition.com.

Gadget Corner

Canon's Tiny Powershot S330

We love the tiny cameras you can attach to handheld computers, such as the eyemodule2, PalmPix, and Memory Stick Camera. While their image quality is utilitarian at best, their small size means you can bring them along without a second thought. And a low-res picture is better than no picture at all, right?

But what if you could have pocket-sized portability and full hi-res digital camera quality? Enter Canon's tiny Powershot S330 Digital Elph. This tiny camera measures a mere 3.7x2.5x1.2 inches, and weighs in at just under 9 oz. Yet it offers a 3x optical/7.5x digital zoom, adjustable ISO, panorama stitch modes, voice annotation, and it can even shoot short (up to 30 seconds) AVI movie files.

The S330 retails at \$499, but can easily be found for under \$400. While you can get higher-resolution cameras for that price, when that photo opportunity presents itself a 2.1 megapixel camera in the pocket is worth infinitely more than a four megapixel camera sitting in the closet at home.



Canon PowerShot S330

Sitting Down with PalmSource's Michael Mace



Michael Mace

In March, PDABuzz.com joined the Handheld Media Group family. PDA Buzz Editor Wes Salmon recently had a chance to sit down with Michael Mace, Chief Competitive Office at PalmSource, and ask him about the spinoff of Palm's development group. What follows is an excerpt from that interview; you can read the full article at www.pdabuzz.com/Features/Interviews/02,22,2002.html

Palm's move to the ARM series processors represents a major shift for the platform, what exactly about the ARM architecture convinced Palm to base much of their future success on it?

Everybody assumes that we did it for the performance you get from ARM, but that was only part of the decision. To me, the most interesting thing about ARM is that there's such a nice array of different designs—you can go from very low power, low cost chips up to very powerful and sophisticated designs that also use a lot of power and cost a lot of money. This will make it much easier for different licensees to create products aimed at different types of customers.

For example, in the demos at the PalmSource conference, Intel showed off multimedia on its prototype board, Motorola demonstrated gaming, and TI showed off how small and light they could make a handheld.

Some folks have assumed Palm OS will only support the lowest common denominator of chip features—that Palm Powered hardware won't be able to take advantage of the special features of a particular ARM design. That's not the case. The OS is flexible, and licensees can customize it to work with the particular features of a chip they choose.

Many new features have been announced for PalmOS 5, one of which is the support for high-resolution displays. There is a bit of confusion regarding how this 320x320 support will affect those licensees who use other resolutions such as 320x240 QVGA such as HandEra, can you elaborate a bit regarding how the "resolution" issue is being addressed?

I don't believe there will be a problem. Palm OS 5 does not disable older display sizes. We added specific support for 320x320 because that's the one most requested by our licensees. But the hooks are there so licensees can support other sizes.

There is no requirement to go up to 320x320, by the way. If a licensee wants to do a Palm OS 5 device with a 160x160 screen (say, to hit a low price point), they will be free to do so.

Palm's Bluetooth strategy seems to be progressing with the release of the Palm branded Bluetooth SD card expected soon. Are you concerned with the possibility that the technology has or soon will pass its window of opportunity, ending up as just one more "standard" that no one uses?

No concern. It's moving at different speeds in different parts of the world. Bluetooth has a lot more deployment in Europe than it does in the US (in Europe it's built into a lot of mobile phones). That's coming for the US as well, and I think the first usage of Bluetooth in handhelds will be primarily handheld-to-phone.

Europe and the US are kind of mirror images when it comes to 802.11b and Bluetooth. In Europe Bluetooth is pretty hot and 802.11b is just starting to make inroads. In the US it's flipped around. I think the cause is the different penetration of mobile phones in the two regions.

You are a visible fixture in a number of Palm discussion forums, and as a result often the target of user and developer frustration regarding the direction of their platform of choice. If you could emphasize one core aspect of the current strategy at Palm to these people, what would it be?

Thanks for asking. I guess the point I want to be sure to make is that we think the key to the future is diversity. The handheld market is a little like the clothing market—you'd never try to make one suit of clothes that was right for every person, but a lot of people seem to be on a quest for the single "ideal" mobile device.

I think it doesn't exist. In the future the market is going to get more segmented, and we want to encourage that by making our OS more flexible, encouraging a lot of software developers, and by working with licensees who want to move in many different directions. I'm not saying we're going to make Palm Powered toasters, but in the mobile device space—things you put in your pocket or purse—we think there's room for a huge amount of diversity, and we want to make that happen.

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by Greg Winton

The Zen of Palm

It all started with a block of wood the size of a cigarette pack. Jeff Hawkins, the creator of the Palm, carried this block in his shirt pocket for three weeks. Whenever he felt the urge for personal organization, he pulled out the block and pretended to schedule appointments, gather contacts, manage tasks and write memos. Then he built the Pilot 1000, a device that did everything the block of wood didn't, and still fit as comfortably in his shirt pocket.

The Pilot 1000 provided immediate access to information, ran for weeks on two AAA batteries, and was small and lightweight enough to carry in a shirt pocket. It was designed from the ground up to be simple, efficient and convenient—a block of wood, only smarter. The simplicity made it accessible to even the most technophobic of IT managers. The efficiency reduced cost and minimized power requirements. The convenience meant it could be kept in a jacket pocket or purse.

Today, Palm-Powered PDAs dominate the handheld market. Innovative devices from consumer electronics giants like Sony and Samsung, are bringing Palms even further into the mainstream. Exciting new communicators from Kyocera, Samsung, and Handspring herald the emerging symbiosis of Wireless and PDA technologies.

Palm's continued success is due to its adherence to basic principles. Through all the innovations and acquisitions and expansion, Palm has remained true to the basic tenets of simplicity, efficiency and convenience. These tenets are the soul of the device, the *Zen of Palm*.

The Zen of Palm is user experience harmony, expressed as responsiveness, minimal power usage and ease of use. Like a hammer in the hand of a skilled carpenter, the Palm becomes an extension of the user; enlightened applications become second nature to use. Unenlightened applications intrude into the user experience, distracting their focus from the task at hand.

Application simplicity is fulfilled on many levels. The user interface should be uncluttered and clear; the user should be able to perform common tasks easily and intuitively. The underlying implementation should be simple as well. The Palm is limited in terms of memory, power and processor speed; simple applications make better use of these resources.

Application efficiency must be built in to the application, and is evident in its responsiveness and resource requirements. The user should rarely have to wait for an operation to complete. Large applications tend to run more slowly; large databases slow the retrieval and exchange of information. Definitionally, both require more storage space, which is at a premium on handheld devices. Efficient applications run faster and require fewer resources for execution and storage.



... a device that did everything the block of wood didn't, and still fit as comfortably in his shirt pocket.

Application convenience is measured by the number of taps it takes to perform a function. Commonly used functions are available with a single tap from the application's main screen. Less frequently used functions are available with two taps; rarely-used functions require more taps.

Enlightened applications pursue the Zen of Palm. These applications are simple and intuitive; one can master the basics without recourse to online or printed documentation. They are consistent with the built-in Palm applications and the device itself; one is not surprised by discordant behavior. They fulfill the user's expectations and serve the user's needs; one is focused on the task, unaware of the application solving it.

Enlightened Palm applications run cleanly and efficiently on the device, provide a simple, efficient user experience, behave consistently and co-operatively with the built-in applications, and use resources efficiently.

Enlightened applications create a harmonious user experience; the application safely, unobtrusively, intuitively eases the user through the appointed task. Enlightened applications do fewer tasks better rather than more tasks worse.

How does one know whether an application embodies the Zen of Palm? As essential as it is to the Palm Economy, the Zen of Palm is woefully under-documented. Information is scattered across websites, mailing list archives, books and the gray-matter of a variety of veteran developers. A rich oral tradition, you might say.

This column will consolidate, illuminate and elucidate this information for developers and end-users alike. Hopefully, it will inspire developers to seek the Zen of Palm in the applications they create and users to appreciate this Zen in the programs they buy.

Greg Winton is author of Palm OS Networking Programming. To contact him, visit www.gregsprogrammingworks.com.

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KILLING TIME

by Benjamin E. Sones

Astraware Launches a New Lineup

It's feast or famine. Those crazy cats at Astraware have added five new games to their lineup, and in typical Astraware fashion, they all sport solid gameplay and consistently strong production values. Two stand out from the crowd, however, so if you don't want to dish out \$70 for the lot (they aren't offering a package deal), stick with the best.

Astro Defense is probably the most noteworthy game of the bunch. Think of it as a glitzy remake of the classic Atari arcade game Missile Command—crossed with Asteroids and cranked up to a manic pace. Oddly enough, it works surprisingly well. Your job is to use a pair of defense turrets to protect three domed colonies on the surface of a barren planet from an unending barrage of meteors, bomb-dropping UFOs, formations of unfriendly fighter-craft, and other alien ships. The simple interface makes good use of the stylus; simply tap the screen and your turrets will fire an energy ball at that location. Hold the stylus down or sweep it across the screen and you get a salvo. Each shot fired uses energy (which slowly regenerates), so if you rely too heavily on salvos you can find yourself temporarily defenseless. It's a solid, simple action game that is every bit as fun and addictive as Zap!2000.

Round Up is a slower-paced affair. It works a bit like a slider puzzle—you use a single empty slot to move marbles to the portion of the game board that corresponds with their color. You can only move a marble if it starts or ends the move next to a marble of the same color. It's difficult, perhaps even a little too difficult. If you can solve Rubik's Cubes in your sleep, this is the game for you.

Nisqually, a port of a web game by GameHouse (www.gamehouse.com), is less frustrating. You start with a grid of various colored blocks. Click on two adjacent blocks to swap them. Get three or more in a row and they disappear. You need to clear a certain number of blocks to move on to the next level, and make no mistake—it's tough—but clearing groups provides satisfying little victories along the way.

Big Money is yet another game from PopCap (creators of Bejewelled); this one is almost identical to Dejobaan Games' TapDown (covered in this column a few months ago). It offers a better graphics and a few twists such as collecting money bags to advance levels, but fewer gameplay options.

Eye of Horus is the second highlight of the bunch. It's an Egyptian-themed variation on the classic memory game Concentration. You turn over pairs of tiles and try to find matches. If you don't get a match, the tiles flip face down again and you try to remember what they are. Spells add a nice twist to the mix—turn over multiple pairs in a specific order and you trigger various bonuses or curses. It's an old concept done right.

You can't really go wrong with any of these games, though, which speaks volumes for Astraware's recent track record. The company continues to set a high standard for Palm gaming.

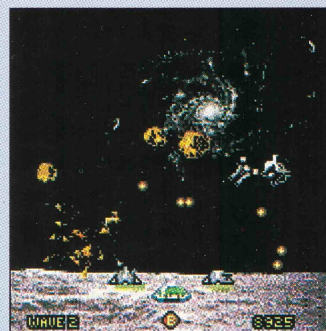
NOW PLAYING

Astro Defender

Price: \$14.95

Developer: Astraware

www.astraware.com



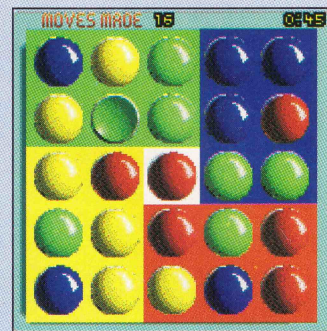
Astro Defense is like Missile Command meets Asteroids, in fast forward.

Round Up

Price: \$9.95

Developer: Astraware

www.astraware.com



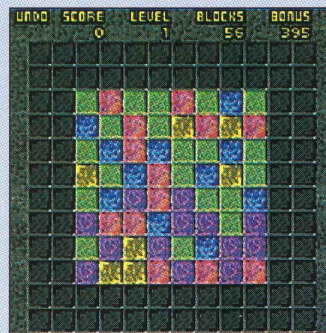
Round Up is a simple but extraordinarily difficult marble slider puzzle.

Nisqually

Price: \$14.95

Developer: Astraware

www.astraware.com



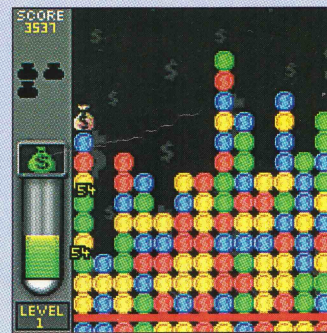
Nisqually is based on the web game by GameHouse.

Big Money

Price: \$14.95

Developer: Astraware

www.astraware.com



Eliminate the coin directly beneath the money bag in Big Money to collect it; collect enough money bags and you advance to the next level.



Eye of Horus

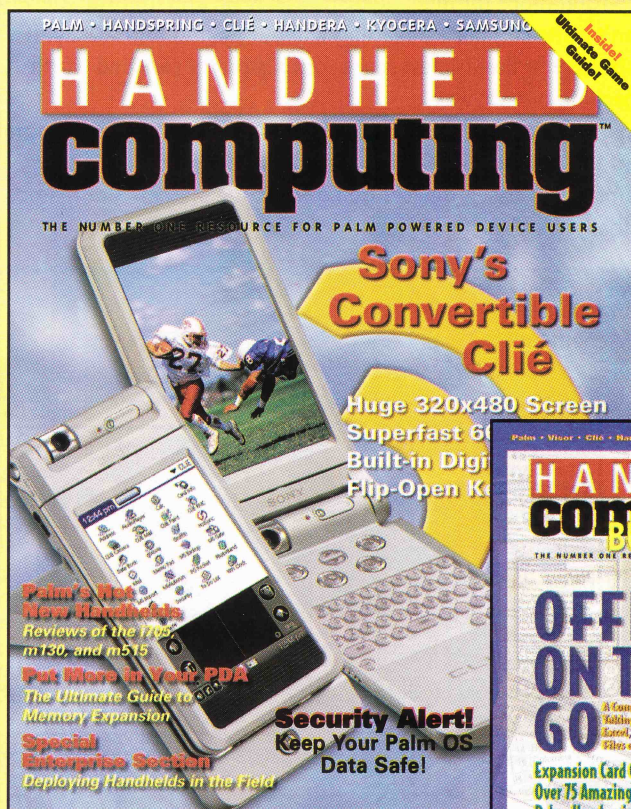
Price: \$14.95

Developer: Astraware

www.astraware.com

Eye of Horus is a classy remake of the classic memory game Concentration, with a few neat twists.

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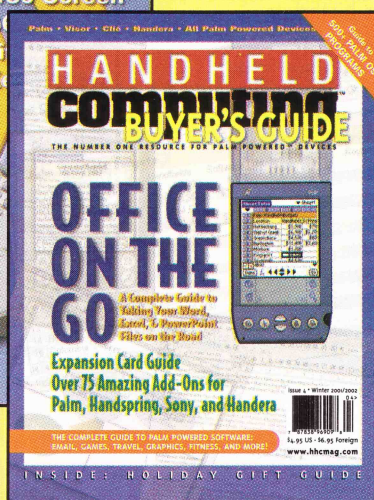


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by Jason Cross

Horoscopes and "Palm"-istry

One of the great things about having 17,000+ programs available for Palm OS is that you can find quality software in almost any area. If you ever get the urge to explore a topic that's off the beaten track, check PalmGear or Handango and you'll be surprised at the versatility of your handheld as an educational tool.

For instance, I've never been able to keep track of all that Astrology stuff. What signs correspond to which birthdays, what their characteristics are supposed to be, what's compatible with what—not to mention all that lunar stuff. I know I'm a Taurus, but that's about it. In the Chinese horoscope, which I'm a little more familiar with, I'm a Tiger. Even if you don't believe in astrological determinism, it can be pretty fun to read about, in the same way that it's fun to read your horoscope. It's also a handy thing to carry with you if you're bad at remembering the specifics, as I am. With these tools, next time you find out someone's birthday, you'll be able to dig up all their astrological info with a few taps of the stylus.

Probably the best description of the 12 zodiac signs common to us the West comes in the form of a folio for TealInfo. It contains a great description of the 12 major signs from Aquarius to Virgo, including personality profiles, favored elements, ruling planets, chosen stone and lucky colors. The folio is free, as almost all of them are, but the TealInfo program needed to view it costs \$16.95 (as shareware, you can use it free for 30 days).

If you're hardcore about astrology, Delphi 2.0 will be right up your alley. It uses the author's "astrolib" library of planetary and lunar positions with incredible accuracy. You'll probably have to know a good deal about astrology to get anything out of it, because this is pretty advanced stuff, but it can create (and beam!) detailed birth charts, and perform synastry comparisons between any two signs. Best of all, it's totally free.

Those who prefer Asian divination should check out Easy I Ching. Fernando Villanova may not sound like the name of someone who would offer forth oriental wisdom, but he's produced an excellent program to mimic the ancient Chinese divination system, now thousands of years old. Each divination is given a detailed interpretation, so the database search can be a little slow. But hey, it's free, so who's to complain?

Don't let the all-Korean web page for EzBiorhythm 3.0 scare you. The application is in English, and it's easy enough to figure out without a manual. It'll give you your intellectual, emotional, and physical biorhythms, a little description or advice on what kind of day you're going to have (complete with a cute anime-style face), and even store other people's birthdays so you can see how your biorhythms match up. The English is a little rough sometimes, but it's otherwise a very polished program.

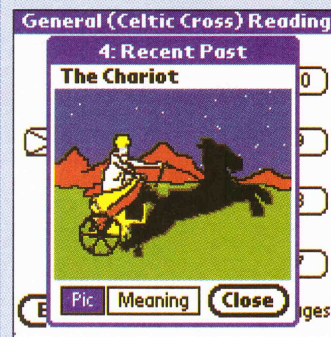
Burton Harvey has produced a pretty nice Tarot card reading

application in Anytime Tarot. It's all 78 cards in color with animation and sound, can do several types of readings, and suggests interpretations for them. Registration is \$10 and unfortunately, you can't quite complete a reading without paying for it. Okay, it's not astrology in the strictest sense, but it's pretty cool and worth checking out anyway.

Of course, all these neat astrological and divination programs can't tell us what we really want to know—when are the new Palm OS 5.0 based devices going to hit the market? Our magic 8-ball says, "Ask again later."

Anytime Tarot

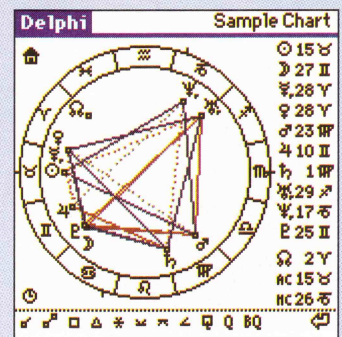
Promethian Personal Software
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Anytime Tarot has spices up a full 78-card deck with color graphics, animation, and sound.

Delphi 2.0

Delphi Twentine
jove.prohosting.com/~delphi29/



Delphi 2.0 is serious astrology.

Easy I-Ching

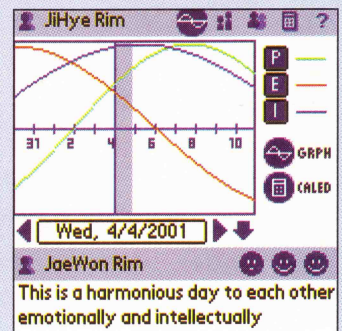
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Easy I Ching is just that—it's simple, but deep, and quite thorough.

EzBiorhythm 3.0

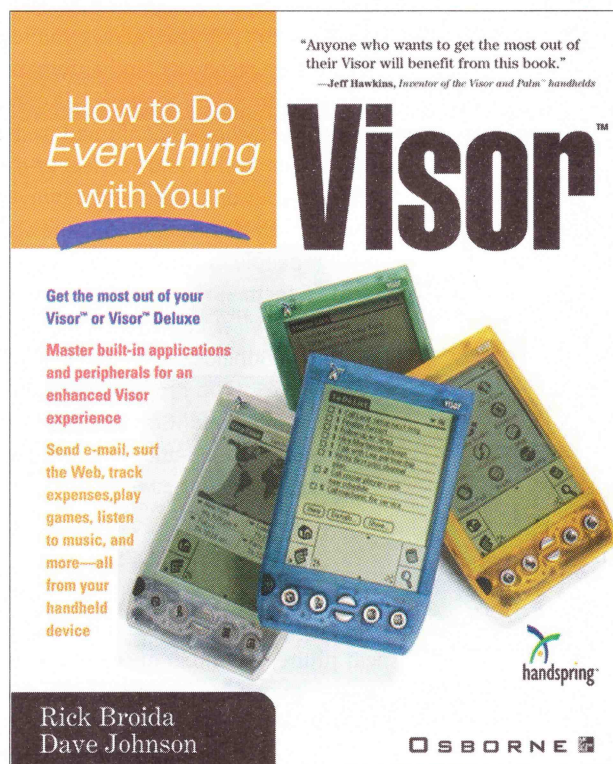
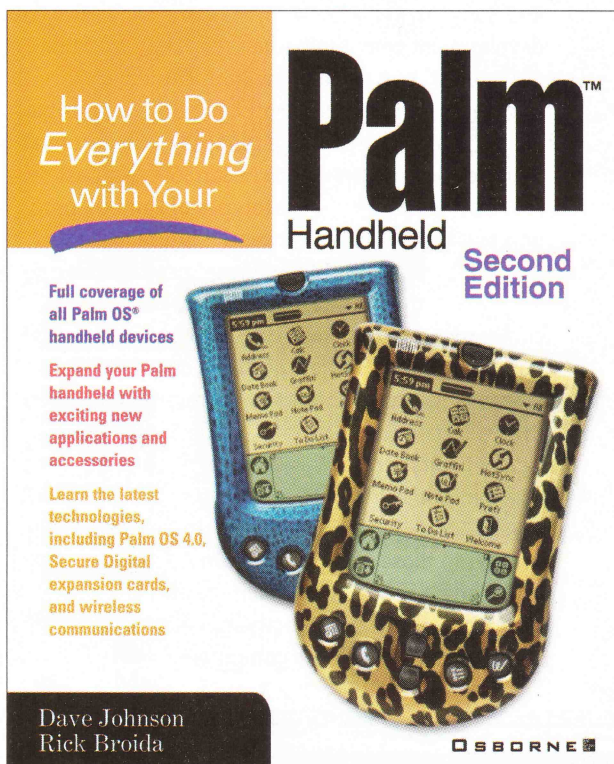
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The web page is all in Korean,
but EzBiorhythm is all in English.

The *How* 2

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R. Broida & D. Johnson
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by Bob Eller

Collaborative Scheduling

A number of collaborative scheduling web sites have previously been available to Windows users but, until now, Mac users were left out in the cold. ScheduleOnline has begun offering Mac users a way to share their Palm Powered handheld's schedule with their friends, family, and co-workers on the internet.

Two entry levels of service are offered. The Silver Service, \$19.95 per year, allows you to schedule meetings, reserve resources, and automatically send or receive invitations. The service also includes the ability to see who has confirmed or declined the appointments. The Gold Service, \$7.95 per month, increases your online storage, removes advertising from the web pages, and adds the ability to see whether people or resources are available before you schedule them.

Both services allow you to HotSync with Palm Powered handhelds on either a Mac or Windows. If you're busy trying to juggle multiple calendars, ScheduleOnline might be what you need. For information and a demo, visit the site at www.scheduleonline.com.

MacOS X Resources

While rumors that the final version of the Palm Desktop for MacOS X should be available in the very near future, a number of conduits have begun to appear which allow third party PalmOS software to HotSync with the OS X desktop.

Landware, www.landware.com, has released a public beta conduit for Quicken 2002 for MacOS X which allows you to share your financial data between Quicken 2002 on the Mac and Pocket Quicken 2.01 for the PalmOS.

PowerOnSoftware has released an OS X version of its Now Up-To-Date & Contact, and has begun a public beta test of its Palm Desktop for Mac OS X conduit. Information, as well as trial versions of the software, are available at www.poweronsoftware.com.

If you or your company have a MacOS X conduit available, please drop us a line at mac@hhcmag.com. As we near the final release of the MacOSX

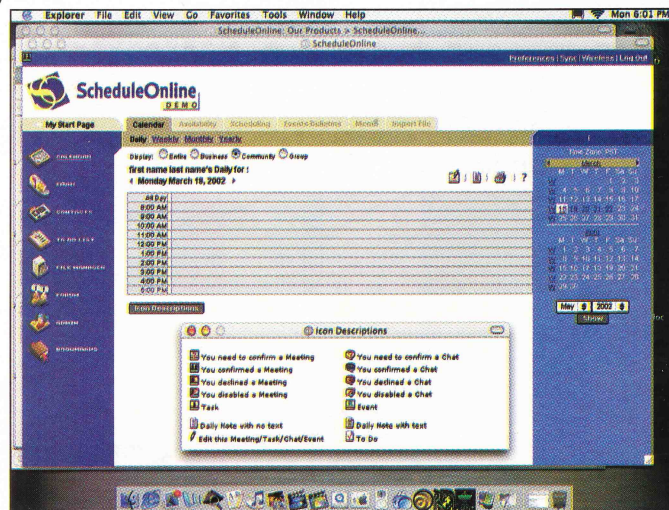
Palm Desktop software, most products will have their final conduits available for release.

Apple Reaches Out

So far this has certainly been a good year for Mac owners who use Palm Powered handhelds. New hardware offerings from Apple, Palm, Handspring, and Sony, as well as new software from the Palm OS development community, have certainly grabbed my interest, and some of my hard earned cash. PalmSource, the new spin-off company responsible for the Palm OS, provided a glimpse of the future at their developers conference in San Jose this past February. Based on the prototypes of Palm OS products shown at the conference, the future looks so bright we might, to coin a phrase, need shades.

One of the brightest notes at the PalmSource conference was the presence of Apple Computer. A number of Apple staffers hosted a booth throughout the week, demonstrating Apple products and offering information and support to the Palm OS development community. This is a very good thing. Providing this kind of one-on-one support to developers should pay dividends to both Apple and, ultimately, to those of us who rely on Apple products. Let's hope Apple's commitment to the Palm OS developers translates directly into new products that support our favorite computers.

Have a question?
A tip you want
to share? Drop
us a line at
mac@hhcmag.com!



ScheduleOnline, for either Macintosh or Windows, can put your handheld's appointment data on the net.

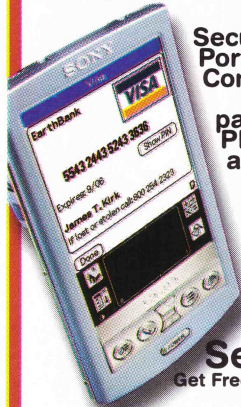
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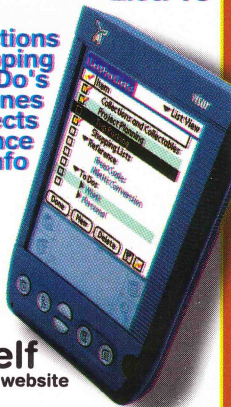
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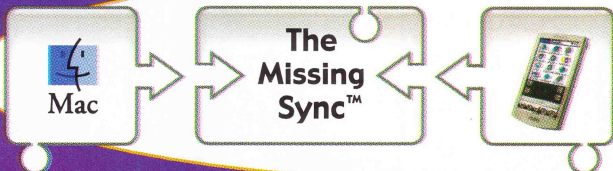


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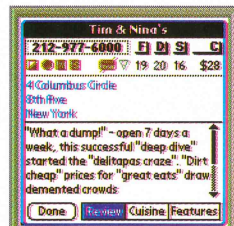
"Pocket Quicken is a great program. Did I say great? I meant life changing! ...you owe it to yourself to try Pocket Quicken"
— PalmPower Magazine



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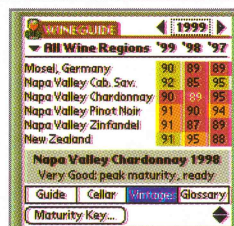
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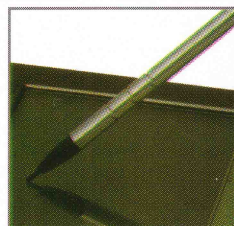
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— BusinessWeek Magazine



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Sony's Invertible Clié



The new NR series brings a whole new look to handhelds

BY DENNY ATKIN

Sony's Clié PEG-NR70V is the biggest advance in handheld design since the Palm IIIC brought color to the Palm OS. But while that device was simply a color update of an existing design, the NR70 series takes traditional handheld design, rips it open, flips it around, and turns it on its head. And that's not even a metaphor.

Sony has decades of consumer product design experience, and it shows in the NR70, which borrows design concepts from Sony's camcorders, audio players, and digital cameras—and perhaps a little from the old Transformers cartoon as well.

When closed, the NR70's titanium shell protects the screen, making the handheld pocketable with no need for a case. Flip the hinged case open and you'll reveal a huge screen, the usual application launch buttons, a built-in mini-keyboard, and—on the NR70V model—a tiny digital camera. If you're not entering text, reach up and give the screen a 180-degree twist and close the hinge. Now you have a traditional handheld form-factor—but with a much larger-than-normal screen featuring a digital Graffiti area.

The NR70 series also features the fastest processor yet in a Palm Powered device, and

CONTACT: Sony
www.sony.com/clie

PRICE: \$499 (NR70),
\$599 (NR70V)

GOOD: Fast, amazing screen,
built-in key board,
superb audio.

BAD: No buttons in fullscreen
mode; very tall; low-res
camera; pricey; no wire
less options.

VERDICT: A revolutionary design
we expect to see more of.



the highest-resolution screen found in any handheld. Despite all this, the NR70 is a bit thinner than the N760C it replaces. Of course, all this doesn't come without a price. First, the NR70 is taller than traditional handhelds, making it a bit more difficult to pocket. And then there's the literal price: the camera-equipped NR70V is a whopping \$599. The NR70 costs \$499, the same price the N760C premiered at.

SCREEN GEMS

By far the most impressive feature of the NR70 is the screen, which at 320x480 pixels ("half-VGA") is the highest-resolution display on any PDA. The screen covers nearly all of its half of the NR70's shell, measuring a large 4.25x2.2 inches.

Brightly lit and with richer color than Sony's recent Clie T615, the NR70's screen lacks the traditional silkscreened Graffiti writing area. Instead, the bottom third of the display is used for a digital Graffiti area, which offers a number of advantages. For one thing, when you flip the screen around to go from keyboard to the "traditional" PDA form factor, the screen image does a 180-degree flip. This would put the Graffiti area at the top of the screen using a traditional scheme. Also, the Graffiti area actually displays your strokes as you write on it. Anyone who has used a Handera 330 will know how

useful this is—it can do wonders for making your Graffiti recognition more accurate. The virtual Graffiti area displays the battery status, whether you have a Memory Stick inserted, and (our favorite feature) the current time.

What if you're not a Graffiti fan? Well, just tap the keyboard icon in the lower right corner of the screen and the Graffiti area is replaced by a small onscreen keyboard. This is a superior solution to the standard Palm OS onscreen keyboard, since this one

The new digital Graffiti area reflects your stylus strokes, and displays the current time.

The NR70's keyboard is excellent for typing short memos or emails.

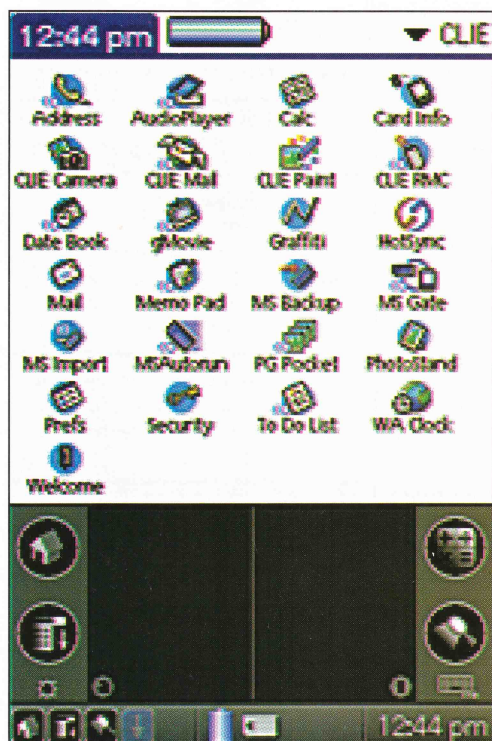
doesn't cover a portion of your application's screen.

Programs written specifically for the NR70's screen can offer an option to turn off the Graffiti area completely when it's not needed and use the additional screen real estate for display. This will be most useful when you're using the physical keyboard, but also makes sense in applications such as ebook readers and picture viewers, where you can use the jog dial to navigate.

KEYS TO SUCCESS

Given that the best way to type on the NR70's physical keyboard is using your thumbs, you obviously won't be matching your desktop computer input speeds with it. But while our input speed was roughly similar to using Graffiti in our tests, we were able to achieve 100% accuracy—something we couldn't match with a stylus.

The 42-key keyboard uses a standard QWERTY layout. You use the Fn key to access numbers and symbols. Overall, the layout is excellent, although we would have liked to have seen a second Shift key on the right side of the keyboard.



Above the keyboard are the four standard Palm OS application launcher buttons, as well as the up/down scroll buttons. These are better-designed than the buttons on the S- and N-series Cliés, and a welcome change from the annoying up/down rocker on the T series. However, once again Sony's "entertainment" PDA has a button layout that stinks for gaming, since the buttons are flush with the surface around them, and they're offset in a "W" shape. (Note to Sony's engineers: Please look at the Handspring Visor and the Palm m5xx series. Their buttons aren't the prettiest, but they're functional.) Hopefully game designers will be quick to support the keyboard for gaming; its cursor keys are laid out nicely for action games.

As with all Cliés, the NR70 has a jog dial on the left side for one-handed use, along with a "back" button that makes one-handed navigation much more viable. The NR70V model also sports a Capture button on the side for launching the digital camera application and snapping photos.

Because the application buttons sit above the keyboard, you'll have to use the stylus or jog dial to launch programs and scroll when you have the keyboard folded behind the screen. This takes some getting used to if you're accustomed to using the up/down keys to navigate.

POWERFUL PACKAGE

The NR70 isn't just innovative on the outside. The PDA is powered by a 66MHz Super DragonballVZ processor, double the speed of any previous Palm Powered handheld. This speedy CPU is backed up by 16MB of memory and Palm OS 4.1. Of course, you can add up to 128MB of additional memory using the Memory Stick slot.

The NR70 series combines the MP3 music playback capabilities of the N710C/N760C and the enhanced synthesized sound of the T415/615 to provide a wealth of audio options. Like the T-series handhelds, you can convert MIDI songs to alarms; thousands of these are available online. A wired remote is included for MP3 music playback control; the funky clip-on earphones included with previous musical Cliés have been replaced here with traditional earbuds. You can play MP3 audio through the internal speaker as well as the earphones, a change from previous Cliés.

The NR70 cradle is angled more steeply than usual; Sony hopes you'll use the handheld as a writing pad. The HotSync connector is the same as the T-series Cliés, and should work with most of the T-series peripherals for those.

SMILE! YOU'RE ON CLIÉ CAMERA

The only difference between the NR70 and NR70V is the inclusion of a small built-in camera on the latter model. The camera's essentially identical in capabilities and resolution to Sony's Memory Stick camera, reviewed on p.63 of this issue. Because it's built-in, though, there's no protrusion, and the camera can save images directly to Memory Sticks.

It's a stealthy little camera—great for shooting pictures of camera-shy individuals. However, there's no way to disable the audible beep that occurs when shooting images, so forget using it for spy shots. With its anemic 320x240 resolution, this camera won't replace a dedicated digital camera, but it's great for shooting head-shots for inclusion in your Clié's Address Book. Also, while it may be very low-resolution, you probably always have your handheld with you, so the NR70 will let you grab "opportunity" snapshots you'd otherwise miss.

Like the T-series Cliés, the NR70 includes an enhanced infrared transmitter that lets it function as an AV remote. The Clié Remote Commander software works with most major-brand TV, VCR, DVD, and AV receivers. Unfortunately, it's not customizable or programmable, so you those of you with cable boxes or TiVos won't find it very useful.

Documents to Go is included for taking Word and Excel files on the road. Other bundled software includes PictureGear Pocket, the gMovie animation player, World Alarm Clock, and Photostand. Of these, only Photostand can display full-screen, but we were already seeing third-party apps that supported the full 320x480 display before the NR70's release.

Note that there is room for improvement here—we're disappointed at the lack of voice recording, the button design is still poor, and the NR70V's camera is state-of-the-art 1997. Most disappointing is the lack of any wireless options, other than connecting a digital cell phone. Still, the NR70V is the most impressive and innovative handheld we've seen in years, and we'll be in line to buy one when it's released in May.



The NR70V model features a small, swiveling digital camera that can save photos directly to Memory Stick.



IMPROVING YOUR MEMORY

Everything you need to know about handheld memory expansion

by Dave Kessler

Not so long ago, concerns about memory on a Palm Powered handheld could be answered with a simple piece of advice: get the most RAM you can afford. The Palm OS used the built-in RAM on the device for all applications and data. And though it used it more efficiently than some other handheld operating systems, when it was gone, it was gone. You didn't get anything else on the device without getting rid of something else.

Then along came TRG (now Handera), with the CompactFlash-slot equipped TRGPro, which gave you the option to add more storage when the internal RAM filled up. Handspring was next up with the Visor line of PDAs. Handspring went one step further by adding the Springboard slot, which supported a wide variety of devices. Handspring offered Flash modules for the Springboard slot, and third-party vendors now have adapters for virtually all memory card types. Sony followed with the Clíé, featuring a slot for Sony's own Memory Stick flash cards. And now Palm has followed suit with a number of m- and i-series devices which feature Secure Digital card slots.

With all these different memory card formats, and all the different software that makes them work, the question of "memory" on a Palm OS device has become rather complicated. This article takes a look at all of these technologies, and will hopefully cut through some of the confusion.

RAM vs. Storage

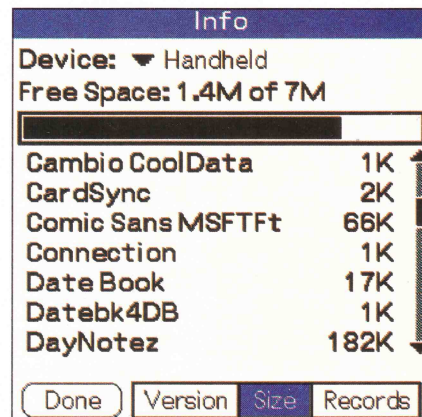
The first thing to understand when dealing with all these different memory options is the difference between RAM and storage. RAM stands for Random Access Memory. That means that the CPU (the central processing unit in your handheld) can directly read or write any location in RAM at any time. But RAM has a problem. It needs to have a constant source of power or it loses all the data that it contains. For memory inside the handheld, this is not a problem. The device always feeds a small amount of power to the RAM and as long as your batteries are good, the RAM keeps its data. But for memory on a removable

"memory card", RAM doesn't work very well. It would need to have a battery on the card itself so it didn't "forget" everything when it was removed. Given the ever shrinking size of memory cards, that's just not practical.

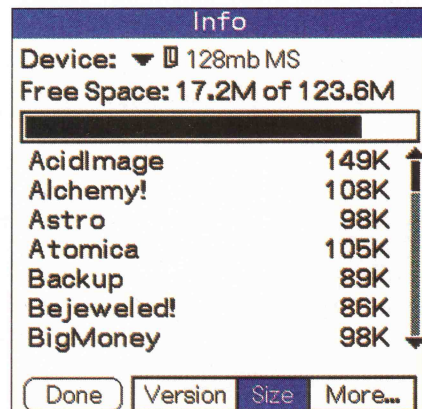
So instead, most memory cards use various types of Flash memory. Flash memory is very different from RAM. In fact technically, it is known as Flash Erasable Programmable Read-Only Memory (Flash EPROM). That data can be read from any location in the memory, but to change the value in any given location, the entire block (typically 16 to 32K bytes) has to be erased and rewritten with all the data that was already there plus the one changed value.

The CPU doesn't know anything about erasing and rewriting memory blocks, so when Flash is added to a system, the CPU typically treats it as Read-Only Memory (ROM). To put data into the Flash, special software is required.

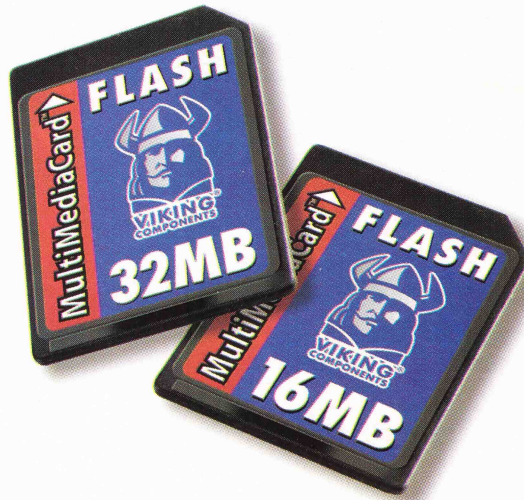
Now, to further complicate things, the type of Flash just described has a couple of problems. One is that it's relatively expensive to produce. The other is that the hardware interface to it is complex, requiring many signals from the CPU. For 8MB of Flash, the memory needs about 48 signals from the CPU. That means the memory card connector needs at least 48 pins. That's not too bad, and in fact, that's exactly what Handspring did for their 8MB



Considering that the first Pilots had only 128K of memory, it's hard to believe how easy it is to fill the 8MB most Palm Powered handhelds currently ship with.



By adding a memory card, you can have 128MB or more of additional storage.



MMC cards can be used in SD-compatible devices, but while they're cheaper, they're also slower.

Flash Springboard module. However, for larger memory cards, more signals and more expensive memory chips would be required, and that quickly becomes impractical.

The solution lies in simplified Flash chips that are easier to produce and require fewer signals to operate. This type of memory is used in virtually all CompactFlash, SmartMedia, Secure Digital/MMC, and Memory Stick memory cards. The downside of this type of memory is that its interface is no longer a type that CPUs "know" how to use.

What that means is that programs and data on the memory card cannot be directly accessed by the CPU. Every byte of data on the memory card has to first be copied to RAM before the CPU can access it. In essence, memory cards have to operate like disk drives in a conventional PC. The system now requires driver software to get data on and off the memory card. While there are ways to make this transparent to the applications, the fact remains that the CPU never accesses the memory card's data directly. Special driver software (built into the Palm OS in versions 4.0 or later, and included on Sony and Handera PDAs) is necessary for your handheld to see data in external memory.



CompactFlash cards are now available in a whopping 1GB solid-state versions.

Memory Card Formats

With PCs and laptops, there has always been a single predominant standard for memory cards. Formerly called PCMCIA and now known as PC Card, that standard defines both the electrical interface and the physical form factor of the cards. Unfortunately, no single standard has been able to satisfy the needs of the handheld world. A combination of technology licensing battles and varying system requirements has badly fragmented the handheld memory card market. The result is several competing memory card standards.

CompactFlash (CF). CompactFlash is one of the oldest handheld memory card formats. Originally



InnoPocket's FlashPlus adds CompactFlash support to the Handspring Visor.

developed by SanDisk, CF is basically a simplified version of the PCMCIA memory card format used by PCs and laptops. CF cards are available in two form factors (Type I and Type II), with the only difference being the thickness of the card. CF cards are available in capacities ranging from 2MB up to 1GB. In addition, IBM has developed a line of tiny hard disks (Microdrives) that fit in the CF form factor. The Microdrives offer capacities over 1GB, but are extremely power hungry and will only work in handhelds with substantial power reserves.



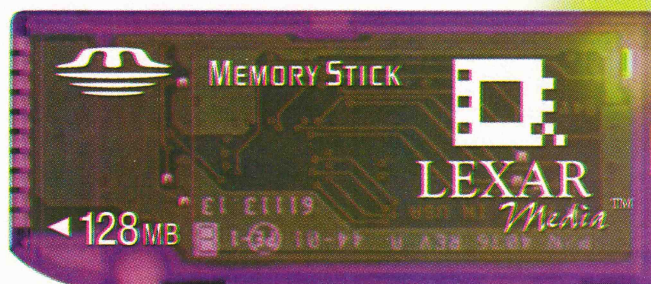
Given the popularity of digital cameras today, it's no surprise that Lexar sells its cards in film-like packages.

CF memory cards feature an on-board controller chip that actually makes the card look exactly like a hard disk to the system that it is connected to. This has the advantage of offering a very high speed interface that is easy to integrate into existing systems. The downside of CF is that the cards are physically larger than most of their counterparts, and they tend to consume more power.

TRG (now HandEra) has CF support on all of its handhelds. In addition, Handspring Visors can now access CF cards using one of several third-party CompactFlash adapter Springboard modules such as the Innopocket FlashPlus or MemPlug CompactFlash.

SmartMedia. Developed by Toshiba, SmartMedia is basically CompactFlash without the on-board disk controller logic. SmartMedia cards are available in capacities from 4MB to 128MB (though some older devices designed before the advent of high capacity cards may have compatibility issues). SmartMedia cards are incredibly thin (thinner than the average credit card) and feature a connector made of an array of gold contact pads. Their small size makes them extremely convenient, but that and the exposed connector make them more susceptible to damage than other memory cards.

The absence of on-board controller logic makes SmartMedia cards very power efficient, but it also makes interfacing them to the system more difficult. Systems must either provide their own controller logic (which will add to the system's power consumption) or implement the controller logic in software drivers which



Lexar's newest Memory Sticks include an LED to insure you don't remove them while they're still being written to.

can hurt performance in systems with limited CPU resources.

While very common in digital cameras, SmartMedia is only used in the PDA world by the MemPlug Springboard module and the AxxPac module for the Palm III series.

Memory Stick. Sony, in typical Sony fashion, had to create its own memory card standard for use in their array of handheld consumer products. The resulting Memory Stick format is sort of a cross between CompactFlash and SmartMedia. Though Sony has been pushing hard for other vendors to adopt the Memory Stick, acceptance outside of Sony is more limited than other formats. Memory Sticks are physically about the size of a stick of chewing gum and readily available in capacities up to 256MB. The Sony Clié uses Memory Sticks, and there's a MemPlug adapter for using them on the Visor.

MultiMediaCard (MMC)/Secure Digital (SD). SanDisk, seeing the migration away from CompactFlash and toward smaller, less power hungry memory cards, developed a new format known as MultiMediaCard (or MMC). MMC cards are physically the smallest of the current crop of memory cards, and are arguably the most power efficient. They feature a very simple serial interface that makes integrating them into a system almost trivial from a hardware standpoint (software is a different story). However, their small size works against them when it comes to capacity, with the largest readily available MMC cards maxing out at 64MB. MMC



This SanDisk SD card stores 128 megabytes of data in a device the size of a thumbnail.



McFile 46 Files MS	
Name	Size
..	
AcidImage_BE[1].prc	149K
Alchemy.prc	108K
asimovsciencefictio...	222K
Astro.prc	98K
Atomica.prc	105K
BackupBuddyVFS.prc	89K
Bejeweled.prc	86K
BigMoney.prc	98K
/PALM/Launcher	
<input type="button" value="Mark"/> <input type="button" value="Copy"/> <input type="button" value="Move"/> <input type="button" value="Del"/>	

Utilities like McFile are better choices for managing files on memory cards than the Palm OS launcher.

Memory cards let you bring an amazing amount of data with you on the road.

cards were targeted primarily at the digital audio player market (they are more efficient at streaming data out of the card than random access) and are finding their way into many MP3 players.

Secure Digital is a variation on the MMC standard. Devised to incorporate copy protection features into the card, SD is envisioned as a format that could allow future distribution of various forms of digital content. SD cards are physically thicker than MMC cards; however, devices with SD "slots" can typically accept both SD and MMC formats.

While the debate over the "ethics" of copy protection and the quality of the security raze on, the fact remains that unprotected SD cards offer the same capabilities of MMC cards, plus the potential for higher capacities. Palm felt that SD offered enough potential that they selected it as the memory card format to be used in the m500/m505. Also, HandEra has added an SD slot (in addition to the CompactFlash slot) on the Handera 330.

Handspring Flash Module.

The Handspring 8MB Flash Springboard module is different than all the other memory cards,

in that it is the only to offer Flash memory that is directly addressable by the CPU. This has major advantages in terms of ease-of-use, in that data on the module can be seamlessly accessed by the Palm OS as though it was built into the Visor's ROM. The downside is that capacity is limited to 16MB, and the cost per megabyte of this solution is much higher than any of the other memory card formats.

There's also no interoperability with other devices. With other types of memory cards, the potential exists to use the same card in your PDA, digital camera, MP3 player, and even your PC, and share data between all those devices.

Memory Card Software

We've established that for the CPU on a Palm Powered handheld to run a program or see data, that code or data must be in directly addressable memory. If your data or apps are on a memory card, your handheld will need special software support that tells it how to read data from the card.

This collection of functions is often referred to as an Application Program Interface or API. Initially, there were a number of different APIs, all of which required special support. The original TRGPro memory support, Sony's Memory Stick API, and various memory Springboards all used custom APIs, making supporting

FAFileMover RAM CF	
[parent directory]	0
[root directory]	0
\Nieta	0
Anthe	32.3K
Anthe	26.3K
Dir: \Ebooks	
<input type="button" value="Copy"/> <input type="button" value="Info"/> <input type="button" value="Del"/> <input type="button" value="Name"/> <input type="button" value="Size"/>	

The FAFileMover application is used to copy files to and from the FlashPlus module.



all of them a nightmare for software producers. With Palm OS 4.0 and its VFS API, a single standard was set that all other manufacturers are now adapting to their own products.

DataManager Extensions. TRG/Handera was the first to realize that perhaps the best approach was to develop a scheme that didn't require application developers to put any memory card support in their applications. Instead, it created an application called AutoCF that essentially tricks existing applications into using the memory card without the application's knowledge.

To understand how AutoCF works, you need to know a little bit about how the Palm OS manages RAM. When data or applications are in RAM, Palm OS has to have a way to keep track of it all. So the Palm OS, ever since its earliest versions, has had a set of functions for accessing code and data that is stored in RAM. When you ask the OS to run an application, it calls some of these functions to locate the code and "lock" it to a certain place in RAM. When a running application wants some data from one of its databases, the application calls those functions to "lock" the data to a certain place in RAM.

What AutoCF does is "intercept" all of those operating system functions that deal with keeping track of the databases and applications in RAM. So let's say an application uses the function that finds a database in RAM. AutoCF "sees" that request and also looks for that database on the memory card. The application doesn't know AutoCF is doing this. It just knows that the database was found and assumes that it must be in RAM. Later, the application uses a Palm OS function to read a record out of that database. AutoCF again "sees" that request. This time AutoCF goes through the file on the memory card, locates the record that was requested, copies that record to RAM and tells the application where to find it. The application doesn't know that this just happened. All it knows is that it asked where a particular record was and the "system" found it.

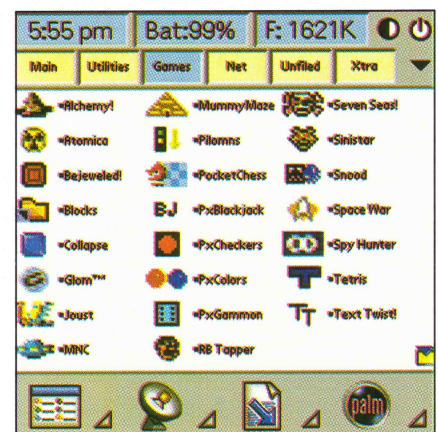
Now, running an application is not much different. In that case the OS is using its own functions to find out the location in RAM of the application's code, so it can run it. AutoCF again "sees" those requests and copies the application's code from memory card to RAM, and then tells the OS where it is. The OS doesn't know that this happened and in most cases, it doesn't care. All it knows is that it found a place in RAM that has the code it wants to run.



A device like the Addonics Pocket Digidrive makes copying large files to memory card a snap, particularly if you own multiple handheld devices which use different cards.

That's AutoCF in a nutshell. Of course AutoCF is designed to work only with TRG's memory card API so other hardware developers have implemented similar software for other systems. For the Clie there is MSMount, and for the MemPlug SmartMedia Springboard module there is PiDirect. The names and supported hardware may be different, but all of these "virtual ROM" utilities work pretty much the same way as AutoCF. The good thing about the virtual ROM approach is that neither the OS nor the applications have to "know" anything about memory cards. They get to keep assuming that all their stuff is in RAM and when they ask for it, the direct access software puts it there. This means that pretty much any application, no matter how old and out of date, can use the memory card to store its data. The downside is that the stuff on the memory card is treated as "read only". Applications can't write anything to the databases on the memory card.

There are other drawbacks to the virtual ROM technique. The OS functions for accessing data were designed to work really well when the data is always in RAM, but because of that, applications using those functions often make bad assumptions about how easily they can get to the data they want. For example, Mapopolis databases have most of their data piled into one huge record. The application may only need a small chunk of that data, but because there's no way to



Many third-party launchers, such as MegaLauncher(VIP), can launch applications in VFS memory.



PowerRUN 1.1b7 Internal		
Internal	Size	Launch
Access #s	13K	3 sec
Act Names	400K	11 sec
AG Connect	43K	3 sec
Applications	202K	7 sec
AvantGo	335K	19 sec
Backup	95K	6 sec
DayNotez	185K	8 sec
eWallet	127K	6 sec
FontBucket	347K	11 sec
Free Internal:1.9M Card:18.0M		
Run Move Delete		

PowerRun simplifies using programs on memory cards, particularly on Palm OS 3.5 handhelds like the Clie N710C and S300.

know which chunk it needs, the entire record (which ends up being almost the whole database) has to be copied to RAM. The file format that Palm databases are stored in is also very inefficient for locating records quickly. It was designed to make it easy to move entire database from one system to another quickly and easily, and not for efficient random access.

VFS. When Palm wanted to add expansion card support to its own handhelds, it recognized two things. One is that a standard memory card access API needed to become part of the Palm OS. The other is that while virtual ROM utilities work fine for existing applications, they are not well suited to future applications that want to make smarter use of the memory card. To address these issues, Palm created the VFS Manager.

The VFS Manager is an API, much like those that already existed from other vendors. However, by putting the official "Palm OS" stamp on it, it becomes a standard that application developers feel compelled to support. If you are an application developer and you only have the resources to make your code support one API, it's not hard to guess which one you're going to pick. Existing vendors have seen the writing on the wall and have created a VFS "layer" that sits on top of their proprietary APIs. At the time of this writing, Sony and HandEra both have VFS Manager software for their Palm OS 3.5 models, Kopsis has VFS Manager software for its supported CompactFlash adapter Springboard modules, and similar software is available for the MemPlug Springboard module. Though there are minor differences in how the software for these different implementations works, the differences should be invisible to VFS applications.

Instead of using the same set of functions to access RAM and memory cards, VFS adds a whole new set of functions that are completely memory card specific. If an application wants to get data from RAM, it calls the RAM access functions. If it wants to get data from a memory card, it calls the VFS functions. The VFS functions ultimately copy the data to RAM, but now the

application can have more control over what data it gets. The application doesn't even have to keep its data in Palm database format. It can use whatever form is most efficient for the task at hand. The application also has the ability to write data to the memory card, eliminating the "read-only" limitations of other approaches. With this "unified" interface to the memory card hardware, applications can now utilize memory card resources without having to worry about what type of Palm OS device they are running on.

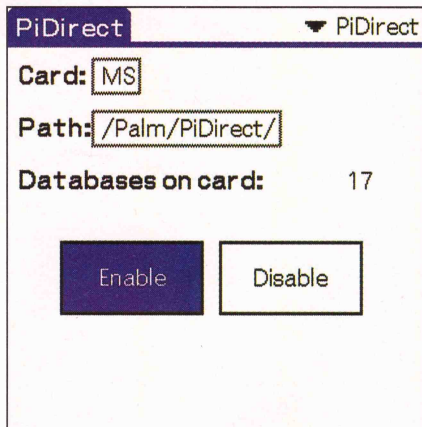
But every silver lining has a dark cloud. In order for an application to use the VFS functions, it must know about them. And right now, only the newest Palm applications have VFS support. If an application doesn't know about VFS, then it can't get its data off the memory card (without some additional help; see below). But Palm, being the proverbial 800-pound gorilla of the PDA world, decided that's OK. They know that many people will buy Palm OS 4.x handhelds, and those users will want applications that can use the SD card. Developers can either ignore those users, or scramble to release new versions of their applications with VFS support. Lately, there's been a whole lot of scrambling going on.

Using Extra Memory

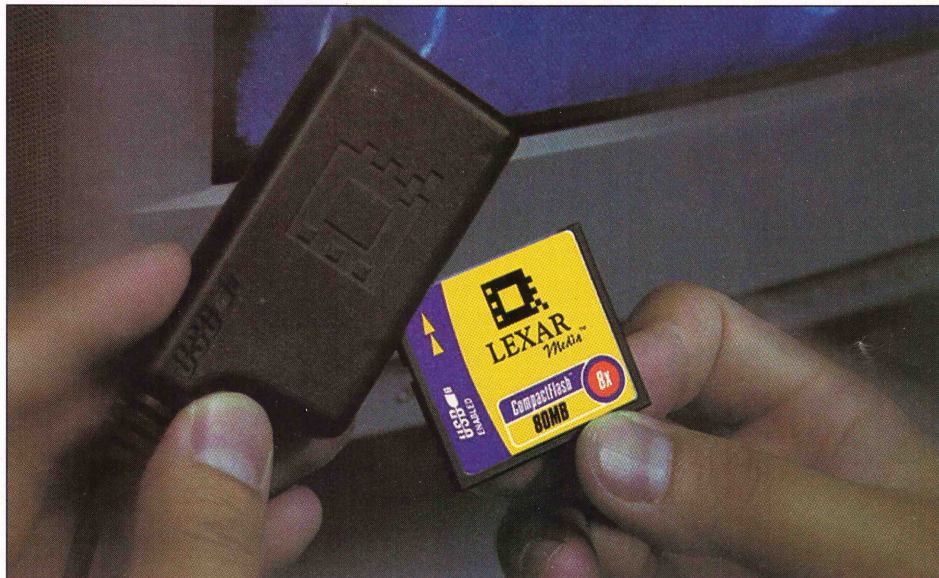
While it's good to know how all this memory card stuff works, what's really important to most users is "how do I use it?" For a detailed answer to that question, you'll have to consult the documentation for the device in question. But in general, the following scenarios apply.

Running applications using "virtual ROM" software (AutoCF, MSMount, PiDirect). With everything properly installed, you'll need to use a file mover application to copy the desired applications to a specific directory on the memory card. Once there, their icons will appear in any launcher you use, and running the program is as simple as tapping on the icon. Running applications stored on the card may be a little slower than running them directly from RAM, but in general, you won't notice much of a difference.

Accessing data with "virtual ROM" software. Read-only databases can be copied to the memory card, much like applications. When the application accesses records in the database, they are copied to



PiDirectVFS lets most programs—even those with additional database files, like Scrabble—run from memory cards.



Some of Lexar's CompactFlash cards can be used with a USB adapter for fast file transfer between your handheld and desktop computer.

RAM automatically by the virtual ROM software (and deleted when no longer required). Databases that will be written to by the application may not be kept on the memory card. The amount of RAM that must remain free for this to work varies depending on the structure of the database. Databases that contain many small records like DOC files will need very little free RAM. Databases with a few huge records (such as Mapopolis maps) will often require that you keep an amount of free RAM nearly equal to the size of the database. Figuring out what databases can be kept on the memory card and how much RAM they will need for access usually involves a bit of trial-and-error.

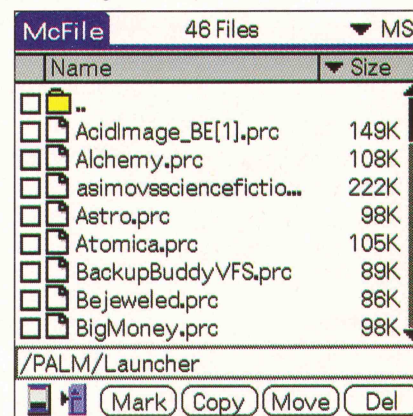
Running Applications Stored on the card with a VFS-enabled launcher. The launcher built into Palm OS 4.0/4.1 handhelds already knows how to use VFS functions to see and run applications stored on the memory card. On other handhelds, it may be necessary to use a third party launcher to get this capability. Many third-party launchers such as Launcher III, MegaLauncher, and SilverScreen support launching programs stored on memory cards. With a VFS-enabled launcher, things work much as they do with "virtual ROM" software. You use a file mover application (or in the case of Palm OS 4.x, the launcher itself) to move the applications you want to a specific directory on the memory card. Once there, the icon for the application appears in the launcher, and tapping it causes the application to be automatically copied to RAM and run.

For users who want to use a launcher that is not VFS enabled, a third-party solution called PowerRUN (www.tt.rim.or.jp/~tatsushi/powerrun/index-e.html) will generally do the trick. PowerRUN lets users select applications they want to run from the memory card. It then copies the application to the card and creates a tiny "shortcut" program in RAM with the same name and icon as the original application. Tapping the shortcut icon sends a command to PowerRUN telling it to copy the application to RAM and run it.


PiDirectVFS (www.pitech.com) works in a similar manner, but it has better support for handling applications that also use external database files. With the built-in launcher and some other utilities, data files must be left in the handhelds main memory. With PiDirectVFS, most applications and data files can be copied to memory card in their entirety.

Accessing data on the card with a VFS enabled application.

Since VFS-enabled applications "understand" the concept of memory cards, they can access data on the card in a variety of different ways. Some will require that you use a file mover application to copy databases to a



The Palm OS launcher's support for managing files in extra memory is fairly limited; there's no "Move" command, just Copy and Delete.



specific location on the card. Others include their own file management capabilities. The important distinction between VFS enabled applications and virtual ROM software is that VFS enabled applications can both read from and write to the memory card, and they require much less setup on your part. Note that some applications are only partially VFS-savvy. The current version of WordSmith, for instance, can be run from VFS memory, and can save documents on memory cards, but it requires its dictionary and thesaurus files to reside in the main RAM memory.



If you own other devices that use expansion cards, such as this LG phone/MP3 player combo, it might make sense to choose a handheld that shares the same card type.

Pick a Card, Any Card

With all these choices the question that usually comes to mind is "which solution is right for me?" That's not an easy decision. However, the capabilities of all the various solutions are rapidly converging. Most memory card solutions offer a choice of virtual ROM or VFS for using apps and data on the card. However, it is worth thinking about what kind of applications you primarily use, and then make sure the options you are considering will support that type of use. For example, if you primarily use old or existing applications and don't want to have to worry about getting new VFS compatible versions, then a virtual ROM solution like AutoCF, MSMount, or PiDirect may be the best way for you to go. If you're more concerned about running new (or new versions of existing) applications, then you should make sure the options you're considering provide VFS.

For many people, the choice comes down to which type of memory card is used by other handheld devices (digital cameras, MP3 players, etc.). The ability to share data between these devices as well as not having to invest in several different types of memory card makes sticking with one format very desirable. If you aren't

already "locked in" to a particular format, then you should consider factors such as speed, power requirements, and durability, as well as thinking about compatibility with handheld devices you may purchase in the future. For many users, the choice is predetermined by which Palm Powered handheld they select. Visor users have the most options, as they can not only use Springboards, but they can also find adapters to use all the other cards mentioned here.

The memory card landscape is constantly changing, with newer devices favoring smaller cards. But older cards offer some advantages as well—they're often cheaper per-megabyte, and they may be the type you already own. It's hard to say what options tomorrow might bring. But given that there were no options at all just a few short years ago, I don't think many consumers will complain about having an abundance of choices.

Dave Kessler is the President and founder of Kopsis, Inc., and creator of the award winning FlashAdapter software that powers a variety of memory card adapter Springboard modules for the Handspring Visor. Visit his site at www.kopsisengineering.com.

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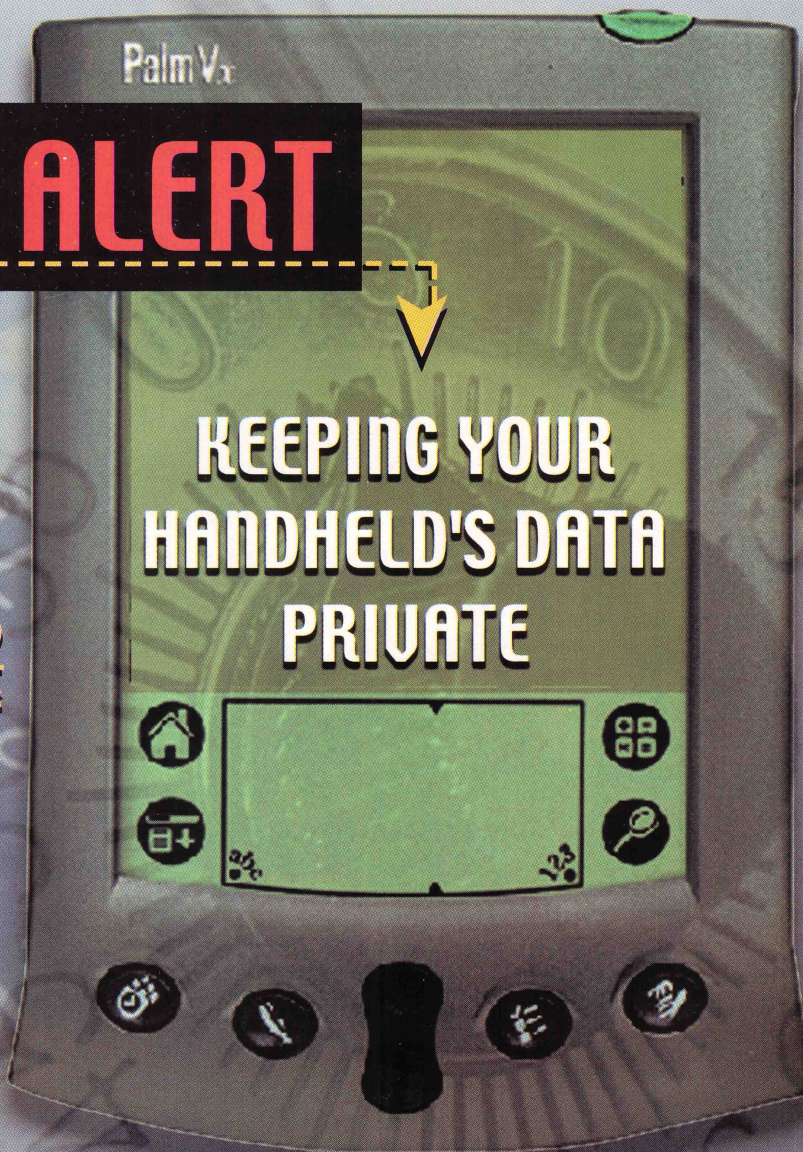
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Treo: You've Got Mail

The line separating Palm's i705 and the Handspring Treo has just blurred. While Palm's connected organizer seamlessly receives corporate email directly from the desktop or a back-end mail server, until recently the Treo has had no such prowess with data communication. Indeed, accessing email via the GSM-network smartphone has required dialing into your POP3 email account via a dialup account at your ISP, and that was just too clumsy for many business users. Handspring and Visto have partnered to streamline email access and make it behave much more like the i705.

Like the i705's email service, Treo Mail is available in two versions. For consumers, there's an Internet Edition that accesses POP3 email accounts like those

offered by Earthlink, Mindspring, and AT&T WorldNet. The Corporate Edition, on the other hand, is for business professionals to access Microsoft Outlook email via a Microsoft Exchange server located behind a corporate firewall. Both solutions offer on-demand email access and scheduled email retrieval, as well as a mode that simulates push-email by using SMS messaging to wake-up the handheld and notify it that email is available.

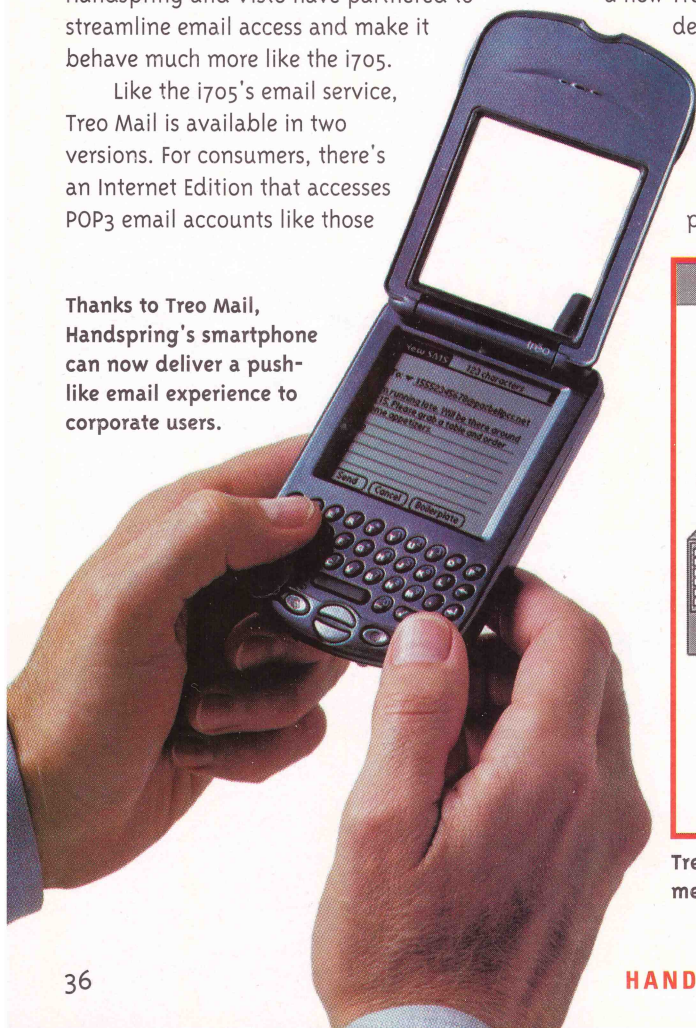
For corporate users, Treo Mail combines a new Treo-based email client with PC desktop software that keeps the Treo and Outlook mail in sync. The Desktop Assistant manages messages according to user-specified filters and preferences, then sends the

appropriate messages to the Treo. Changes to messages on the Treo—like read/unread status—can be synchronized to the desktop as well. At the heart of the Treo Mail system is a Treo Mail Service Operations Center (SOC). The SOC is a wireless data center operated by Visto that transmits messages to the Treo and stores outgoing messages for later transmission whenever the Treo is turned off or out of a service area.

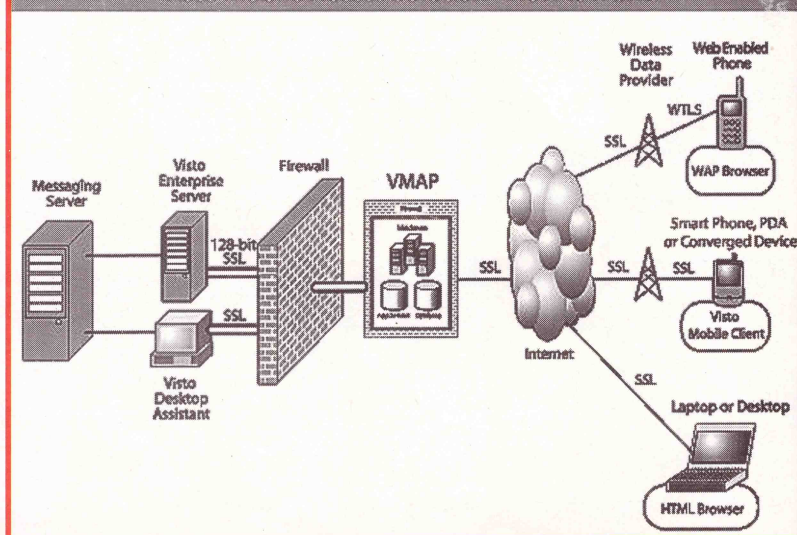
For both the Internet and Corporate versions of Treo Mail, the user's PC must be turned on and connected to the Internet in order to receive messages. Handspring has opted not to support downloading or viewing email attachments, though attachments in incoming messages can be forwarded elsewhere from the Treo.

For organizations that need to deploy Treo Mail en-masse to workgroups that

Thanks to Treo Mail, Handspring's smartphone can now deliver a push-like email experience to corporate users.



Visto Mobile Access Solution - How It Works



Treo Mail relies on Visto's wireless messaging infrastructure, which encrypts messages and delivers them to a "store and forward" network operations center.

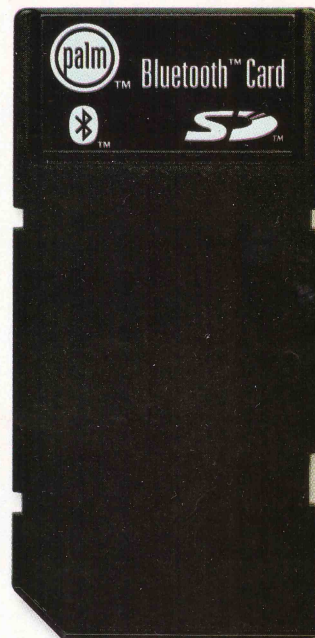
Bluetooth Debuts for Palm

number in the dozens, hundreds, or even thousands, the Corporate Edition of Treo Mail is cumbersome. Visto offers a scalable enterprise alternative called the Visto Mobile Access Solution, Server Edition. The server provides the same user experience as Treo Mail, but processing occurs through the Visto Enterprise Server, a centralized server positioned within the corporate network, rather than from each individual's desktop computer running a desktop client. The Visto Enterprise Server manages any number of Treo users; like the desktop application used in the Corporate Edition, it forwards encrypted email data from the corporate mail server to an operating center where messages are held and wirelessly forwarded. Handspring says that Treo Mail will work with GSM, GPRS, and even CDMA networks. This is a key feature since Handspring will begin shipping a CDMA version of the Treo (for the Sprint PCS network) later this year. Handspring is beta testing the service now and will officially debut Treo Mail later this year.

The Palm Bluetooth Card, a Secure Digital (SD) expansion card for m-series Palms, is now available for purchase at the Palm Web site. The Bluetooth SD card gives Palm-powered devices the ability to wirelessly control a wide variety of Bluetooth devices, such as mobile phones, printers, laptops and other Palm handhelds. It's available for \$129.

Palm's Bluetooth card isn't the first one available for the Palm family of handhelds; Red-M has offered the Blade, a Springboard module Bluetooth adapter, for months, and TDK has clip-on sled modules for the Palm V and m500 series. Blade is only compatible with the Handspring Visor, though, while the Palm Bluetooth card works with all new Palm models with a universal SD slot.

Though the Bluetooth card is available, the world is still a lonely place for Bluetooth. A handful of cellular phones from Sony/Ericsson, Nokia, and Motorola have Bluetooth functionality, along with a small collection of wireless headsets. When used with a Bluetooth mobile phone, the Palm can access the Internet, check email, and send SMS messages. Epson recently started shipping a Bluetooth adapter for its printers. The Palm Bluetooth card itself ships with virtual whiteboard software that lets up to four Bluetooth-enabled Palm devices correspond across a tabletop. Beyond those few applications, it remains a waiting game to see if useful wireless applications arise for this card.



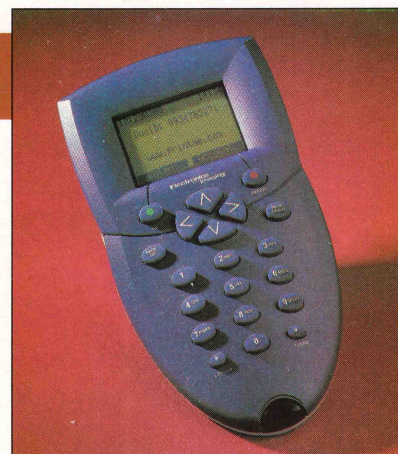
Palm's Bluetooth card delivers on a two-year-old promise, but right now applications are limited.

Print Anywhere

PrintMe just got a shot in the arm, thanks to a partnership with over a dozen new companies. PrintMe is a wireless service that allows Palm Powered devices—along with a slew of other handhelds—to print directly to printers located on the PrintMe network. Right now, PrintMe is deployed in select copy centers and hospitality centers across the US, such as Sir Speedy and the Marriott hotel chain. OfficeMax has recently agreed to become a PrintMe partner as well.

According to Electronics For Imaging,

PrintMe's corporate parent, a host of imaging companies have joined forces with the PrintMe network, including Canon, IBM, Minolta, Sharp, Toshiba, Palm, and Mimeo. They've agreed to incorporate PrintMe technology into new products. PrintMe is promoting solutions not just for retail, but also for IT professionals who want to deploy wireless handheld printing technology throughout their organizations. Visit www.printme.com for more information.

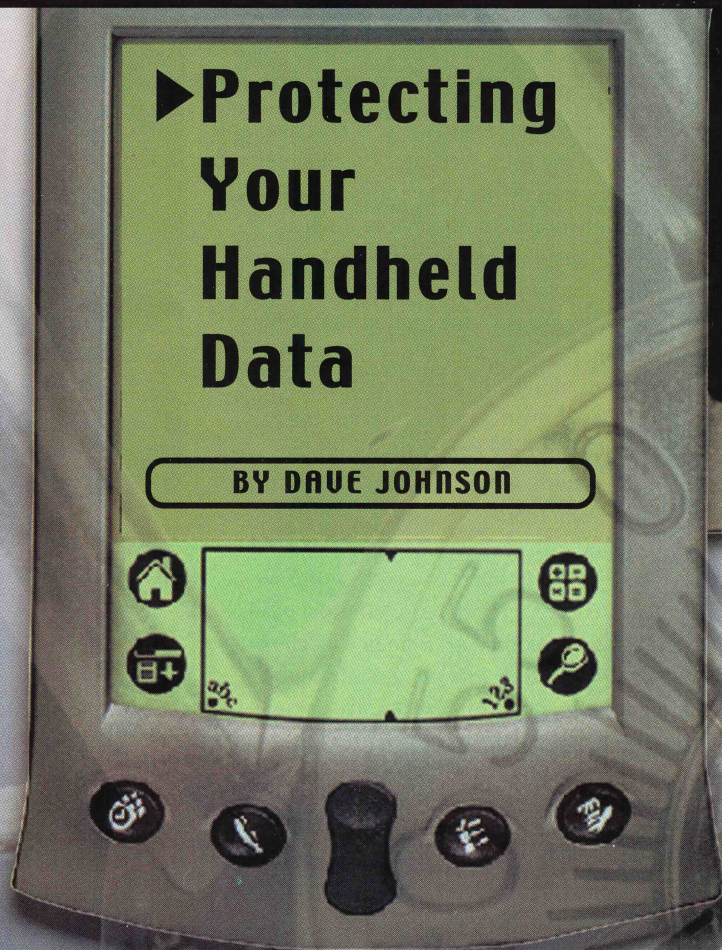


The PrintMe receiver allows you to beam text to be printed.

SECURITY ALERT

►Protecting Your Handheld Data

BY DAVE JOHNSON



Consider the case of Steven Miske, a financial services executive who never goes anywhere without wireless email. After exiting a train on his daily commute, though, he finds his handheld is missing—but doesn't think about the consequences until clients call him, asking why he is sending rude email.

Peter Kobe, a security executive, knew better. When he lost his handheld near a train station, he entered an active set of train tracks to recover his device. Apparently, his fear of losing sensitive corporate data to strangers trumped his sense of self-preservation. Luckily, he and the handheld both survived.

We've changed the names to protect the innocent—or, depending upon how you look at it, the guilty—but the stories are true, and they illustrate that the Palm is not just a piece of personal technology. It's a key component in your personal and corporate information system that can be quite costly if it falls into the wrong hands.

From its outset, the Palm platform was designed to be a handheld adjunct to the



PC. Creating a portable conduit to PIM-style contact and appointment data, the original Palm architects gave little consideration to security and encryption issues. More to the point, Palm Powered devices have traditionally been designed with the end user in mind, not the administrator who has to ensure the company's data is secure. That has become something of a problem for organizations used to laptop- and desktop-style device management.

Security Here and Now

Unfortunately, the security features in the current version of the Palm operating system are lightweight, to say the least. The Palm OS does not encrypt applications or their data. Instead, the principal purpose of Palm security is to hide or mask specific private records. These can be appointments, contacts, memos, or to dos.

Security is a two-step process. To try it out, open the Security application, usually found in the Systems category on the Application screen. Assign a password to your Palm device by tapping on the "Unassigned" text box under Password. You'll need to verify the password by re-entering it. Once you've done that, you can choose a Current Privacy mode. Show Records is the default setting, but you can hide private records—which makes them entirely invisible—or Mask Records, which hides the actual record but leaves behind a gray field so you know there's something there.

With security enabled, you can now open a specific item and set it to Private, rendering it hidden. To see the record, you'll need to open the Security application again and set the Current Privacy to Show Records.

On new Palm Powered devices—specifically, those running OS 4.0 or higher—the security application also allows you to "lock" the handheld automatically, such as after each power-off, or at a certain time each day. (Older models can be locked, but it's a manual process each time.) You need the password to start the Palm again afterwards.

Not everyone uses lockdown though, and there's no provision for administrators to enforce its use. "When I poll people," says the Gartner Group's analyst John Girard, "the number of users who use the lockdown feature are very, very small. That's a good reason to add security software—to get around problems like that."

Not So Secure

Obviously, the Palm OS's built-in security is far too weak for the corporate environment. Consider the password, for instance. There's no mandatory length or required combination of letters or numbers. Users can actually create a password from a single character, sure to send any system administrator into heart failure.

Passwords are also easy to bypass. A free utility called No Security, for instance, can easily circumvent the Palm security application, erasing the Palm's password and exposing all of the private records on the device. It's billed as a way to recover data if you've lost your password, but the reality is that such programs make it all too easy for thieves to retrieve sensitive data on a lost, stolen, or unguarded PDA. There's no need to even HotSync the device to install the app; No Security can be beamed from another handheld.

No Security won't let someone turn on a locked Palm, but some Palm hardware vendors have customized the security feature to even defeat that slim measure of security. The Samsung I300 smartphone, for instance, lets users turn on a locked device by resetting the password to the default password, usually the I300's phone number. If you know the phone number, you can get in without a hitch.

Security Solutions to the Rescue

Before the rise of PDAs like the Palm, few IT departments would consider letting portable PCs leave the office without a reliable method of securing the proprietary information stored on the hard



Out of the box, the Palm has a simple security application for locking down the device and hiding private records.



Every administrator's nightmare: No Security strips away the default Palm password protection with a single click.

disk. Today, Palm Powered devices are no different; the data they contain can be just as critical. Worse, they're potentially even more of a security risk. Thanks to their diminutive stature, they're more easily lost or stolen than laptops. And, by their very nature, Palm Powered devices tend to contain a lot of sensitive data: contact information, meeting notes, CRM applications packed with sensitive client information, and even passwords, usernames, and credit card information.

Indeed, many businesses work with personal client and customer data—like addresses, demographics, and credit card information—that is expensive, embarrassing, and potentially even illegal to lose direct control over. Recent legislation like the Healthcare

Information Patient Privacy Act (HIPPA) and the Gramm-Leach-Bliley Act for the financial services industry even establish penalties for breaching the privacy of customer data.

Based on 15 years of managing notebook PCs, IT departments have certain expectations regarding how device security should work. Those expectations include administrator controls, standard deployment tools, and advanced password and encryption features. A variety of third-party applications have risen to the challenge, delivering robust security to Palm Powered devices that go well beyond what's originally delivered in the box.

But where are the security applications? "There are a lot of security solutions out there, says Bob Gulino, PalmSource's Group Manager, Enterprise Marketing. "It's not like we've ever had an insecure platform. The developers have created some great programs. But sometimes developers haven't always been able to connect with the enterprise customers who need them."

Gartner's Girard agrees. "Often, they don't know where to go—sometimes your best bet is to go to a shareware page. If your best bet for finding what solutions are available is to go to TuCows, it just doesn't feel like an industrial-grade solution, if you know what I mean."

Solutions Abound

Nonetheless, many solutions exist. TealPoint's TealLock, for instance, is a direct replacement for the weak security in the Palm OS. TealLock includes three passwords—an administrator password, guest password, and a "quick" password that just works once. It includes a wide variety of lock-out options. Users can direct the Palm to lock itself at each power-off, after a specified time, or only during certain hours of the day. For particularly sensitive data, TealLock has a self-destruct mode; it can be ordered to destroy the data on the handheld after a certain number of incorrect password entries.

In essence, TealLock makes the

lock-out feature of the Palm a practical security tool for keeping unauthorized users out, since the program has so many ways to customize the security of the device. Passwords can even be set to expire, making it easy to manage multiple users—some temporary—in an enterprise environment.

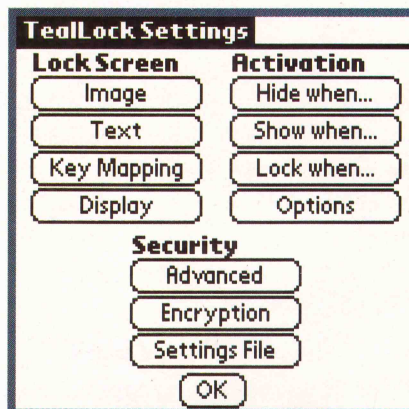
A Corporate Edition of TealLock adds a number of remote administration tools, such as multi-user installation, enforced lockouts, password restrictions, and the ability to unlock devices remotely. TealPoint includes a handful of other features as well. The Palm can be set to display a specific image or text message when locked, and the software goes beyond the built-in security by locking the serial and infrared ports as well.

Another security alternative is PDA Secure from Trust Digital. PDA Secure comes in a variety of strengths—Standard (\$29.95), Premium (\$39.95), and Enterprise (priced by volume). At its core, the program is designed to encrypt data on any PDA, and it requires a password for access. PDA Secure offers users a truly enterprise-level security by encrypting all protected data on the Palm so it can't be read on or off the device without the appropriate password. You can choose from among a half-dozen encryption algorithms, including RC4, Twofish, Blowfish, and XOR.

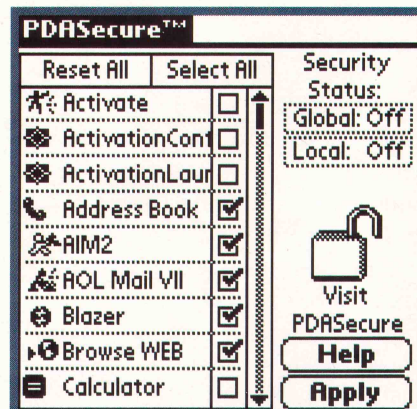
One of PDA Secure's most clever

features, and the capability that makes it stand out from less-powerful security applications, is the fact that you can set both global and application-specific passwords. As a result, PDA Secure can protect all the applications via a single password at startup, or just specific applications via a local password. This gives organizations a lot of flexibility with how to deploy their handhelds. Guest users can get fast and painless access to most applications via a global password, for instance, yet remain locked out from other applications that contain sensitive or private data because they don't know the local password. Alternately, administrators can avoid weighing users down with annoying global passwords just to use their handhelds, but require a local password to enter the company's sensitive CRM applications—thus striking a balance between security and ease of use. Trust Digital offers a companion Policy Editor for the Windows desktop which administrators can use to push security and password policies directly to every PDA Secure-equipped Palm in the organization.

PDA Defense (\$19.95), from Asynchrony, is another device-encryption solution that is similar to PDA Secure. PDA Defense can be set to automatically lock the device or just specific applications. PDA Defense also secures the serial port and IR port, ensuring that the device is rendered inert—there's no

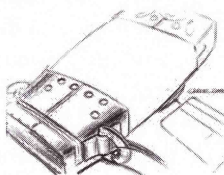


Teal's many lockdown options let you customize what users see when they try to access a locked PDA.



PDA Secure's simple interface makes it easy to encrypt specific applications, leaving the rest of the Palm available for access without a password.

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way to retrieve any data from the device when PDA Defense is activated. Like PDA Secure, PDA Defense lets you choose from among a large number of encryption algorithms so you can find a balance between speed and security for your particular needs.

You can allow an unlimited number of password attempts, or initiate the "bomb" function, which destroys all the data on the device after a certain number of unsuccessful password attempts. The program has a few other unique features. Users can use hardware buttons to enter the password instead of relying on Graffiti—a technique which is faster for many users. For applications that use multiple databases, PDA Defense lets users encrypt only certain databases, allowing unencumbered access to data that isn't sensitive. Finally, a special "stealth" mode changes the system lockout screen to look like the standard Palm security dialog. That is handy since it doesn't draw attention to the fact that the device is protected by additional layers of security.

Asynchrony offers three versions of PDA Defense. PDA Defense Standard only protects the core Palm applications—like the Address Book, Date Book, and Memo Pad—with 64-bit Blowfish encryption. The Professional edition encrypts any or all of the Palm's applications with algorithms ranging up to 512-bit Blowfish, and the Enterprise edition includes a desktop-based administrator tool for pushing enforceable security policies directly to the PDAs when they're synchronized.

Pointsec combines data encryption with some clever and sophisticated access tools. The program has all of the traditional encryption features you'd expect from an enterprise-strength security program. It can enforce mandatory password protection, for instance, so users can't bypass the program during day-to-day use. Authenticated HotSync and IR features ensure that the serial port and infrared port can't be used without the proper permission. The program can also encrypt some or all of the applications stored on the handheld. Developers can



Many users prefer Pointsec's pictograms, which are in many ways more secure than a password.

take advantage of Pointsec's Crypto API to be "Pointsec Ready." Pointsec Ready applications encrypt their data faster than with other security programs since Pointsec's initial authentication can automatically encrypt all the data on the device at once—other programs need to separately encrypt each and every third party program. In addition, Pointsec claims that its Crypto API conserves battery power and improves device performance, since applications can more efficiently encrypt sensitive data, leaving non-critical data in the clear.

The program's most interesting feature, though, is its PicturePIN access tool. Instead of memorizing an alphanumeric sequence of characters, Pointsec uses a sequence of pictographs that the company claims is easier for users to memorize.

PointSec may be experimenting with alternatives to password-based security, but biometrics—like fingerprint, voice, and iris recognition—are clearly the way of the future. CIC is one company that already offers an effective biometric security tool for Palm Powered devices. Sign-On (\$20) requires users to write their signature in the Graffiti zone for access, and that's inherently more secure than passwords. A signature cannot be easily guessed, mimicked, or forgotten, for instance.

PIN Protection

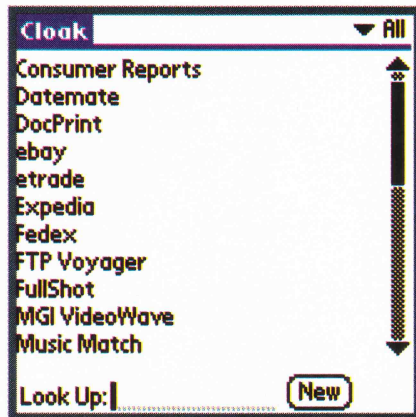
Unlike global encryption software like PDA Secure, Pointsec, and TealLock, some security software is really just an encrypted database that is designed to protect specific records on a device. These solutions are ideal if you keep a limited amount of sensitive information on the device, and don't want to encumber access to the device in general with passwords and other security. Platinumware's Gatekeeper (\$15) is a simple program that is focused on storing personal data like PINS, passwords, and usernames. A single master password secures the entire database, which is a secure alternative to what many users do—simply enter that information in the unsecure notes application, assuming that no one will look for or find the information. If you don't need to protect the majority of applications on data on your Palm, a program like Gatekeeper can ensure your truly valuable data is secure.

Chapura expanded on the idea of Gatekeeper with Cloak (\$19.95), a more sophisticated database. Like Gatekeeper, the program encrypts and stores password-style data on the handheld. Cloak is more configurable, though, able to handle a wide variety of information. Designed principally for information like passwords, usernames, access codes, credit card data, and other personal information, Cloak stores contact information, though it doesn't synchronize with other software like Microsoft Outlook, meaning you need to enter that data by hand.

Cloak uses a single master password to open the database, which features a half-dozen fields for each record. The database is protected by a strong 128-bit Blowfish encryption system, and it automatically closes itself when the handheld is left inactive for a short time, ensuring that the program won't leave all the sensitive data exposed if the device is left lying around. A companion desktop application, protected by the same encryption and master password, duplicates all of the data stored on the Palm.



Gatekeeper is a simple application for protecting personal information like credit cards and passwords.



Secure key information with Cloak, which also synchronizes with its own desktop application.

Looking Ahead

While existing Palm security is provided by a patchwork of third-party applications, all that should soon change with Palm OS 5, which should be available in new PDAs before the end of this year. Palm OS 5 promises to deliver an innovative new core layer of security software that rivals or exceeds what's available in any other operating system.

At the core of Palm OS 5 is the new Cryptographic Provider Manager (CPM), a software layer within the operating system that has provisions for plug-in components "both above and below," according to PalmSource's Bob Gulino. Below CPM, there are hooks that allow third party developers to add encryption algorithms to the Palm. Thanks to Palm's relationship with security giant

RSA, OS 5 devices will include the robust and popular RC4 encryption algorithm right out of the box. But if specific users or applications require different encryption, OS 5 can easily accommodate those schemes via a standard plug-in architecture.

On top of CPM, developers can take advantage of a system-wide authentication and authorization system to plug in additional software components that provide additional security tools. According to Gulino, this extensibility makes development of advanced security features like biometric applications much easier. "Developers just have to worry about writing to a few APIs instead of building the entire application from scratch."

Instead of the Palm's current lockdown and data masking security, OS 5 will feature integrated tools expressly designed for the enterprise. Signed code, for instance, is a feature that administrators can use to require every application on the device to have an authorized code in order to execute. "If you install an application that isn't authorized, it just won't run," says Gulino. Signed code is clearly one of the most dramatic differences in OS 5 and

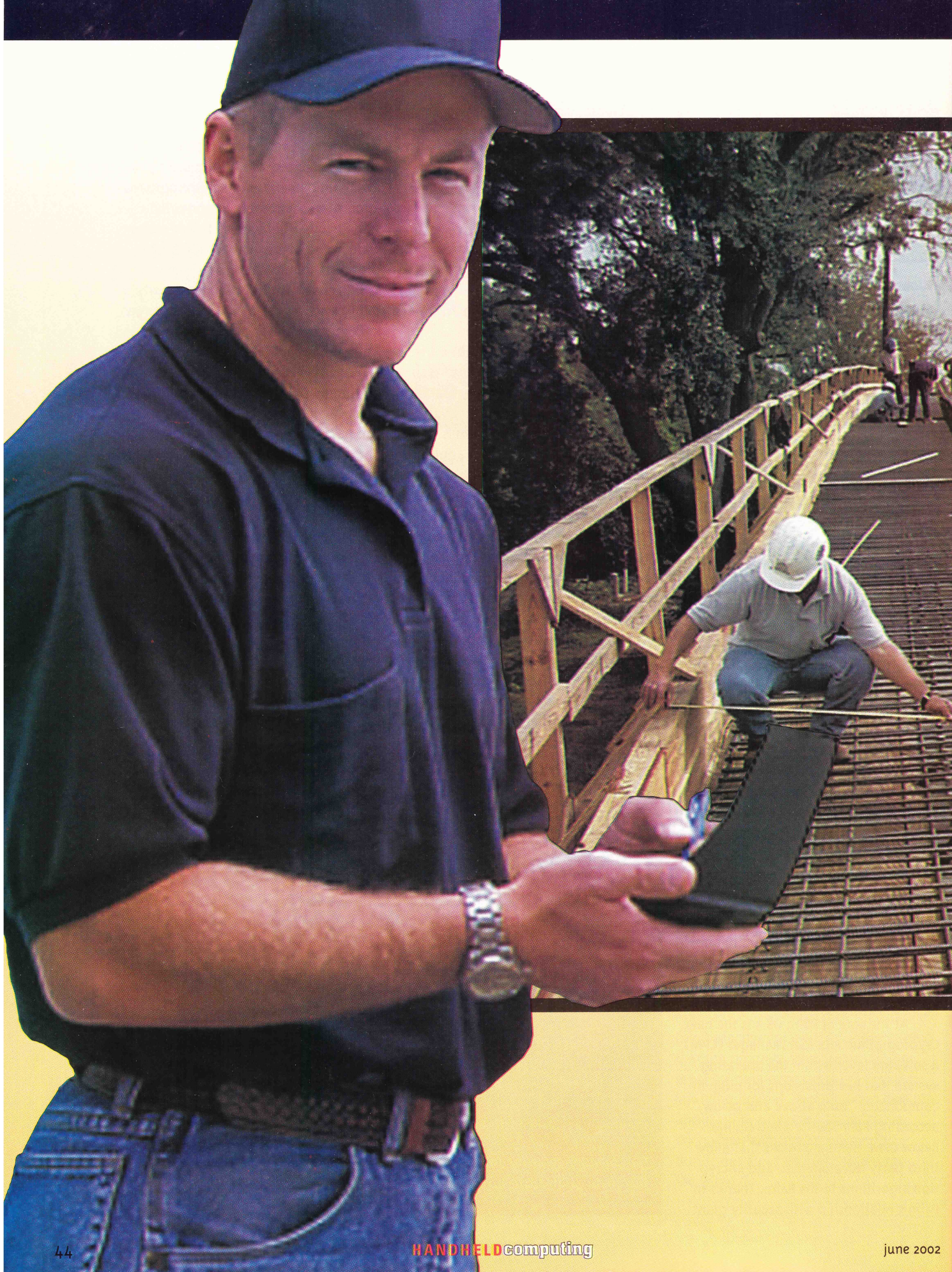
has huge implications for Palm users. Administrators can more effectively lock down the software image on their Palm Powered devices, preventing users from installing games and other unapproved applications. But more importantly, signed code will block malicious software like viruses and worms in a way previously impossible.

For users who want more security, though, one of the most visible changes in OS 5 is the presence of the Authorization and Authentication Manager, which inherits the role now performed by a number of third-party security applications. This software layer can password-protect an application or data set on the device. Indeed, users can protect just one application or any set of applications, delivering a very flexible protection scheme right out of the box. "Of course," Gulino says, "this core security can be easily enhanced by any security application developer as well." That may be true, but administrators will be ecstatic to finally have viable security in Palm Powered devices from the moment they open the box and deploy the devices. Third-party enhancements will no longer be essential to simply establishing baseline security.

JOHN GIRARD'S FIVE SECURITY COMMANDMENTS

The Gartner Group's John Girard offers these rules for establishing a baseline of enterprise security.

1. Don't let users bring their own PDAs into the office. Buy the devices for them so you can control the deployment and software image right from the start.
2. Develop a security policy to control what users install on their handhelds.
3. Require users to use the password-protected lockdown feature.
4. The choice of synchronization software should be established by the company. When the PDA comes into IT, retrieve the PDA from the box and throw the rest away, including whatever sync software came in the box. If you leave that up to the employees, you lose control over what data is moving back and forth across the network.
5. Consider security software that relies not on easily-cracked passwords, but instead on signature recognition or some other biometric solution.





ABOVE: While not "ruggedized," Palm Powered handhelds are still better suited to construction environments than bulky, fragile laptops.

LEFT: Palm OS applications help building inspectors for the City of Aurora, Colorado make better-informed decisions in the field.

With their small size and low cost, handhelds are revolutionizing many tasks in enterprise settings, indoors and out.

Palm Power in the Field

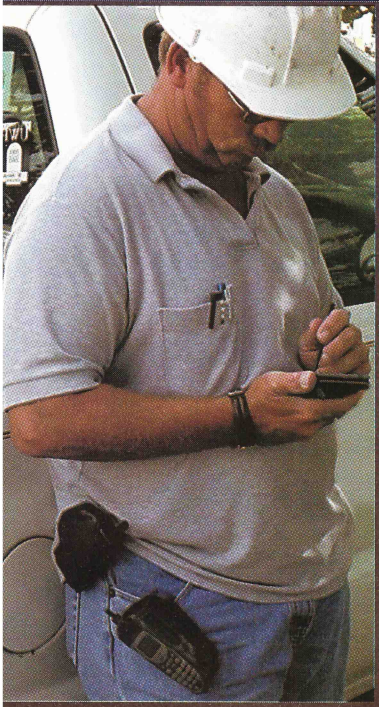
by Jonathan Blackwood

It's not just a matter of size, it's a matter of cost. Palm OS devices aren't just smaller than notebook PCs, they cost less and can be used in situations and environments—such as construction sites—where notebooks just aren't practical. But many enterprises are discovering there are additional advantages to putting their custom applications on Palm Powered handhelds. Namely, that development time is short, and payback—both in dollars and in improved productivity and efficiency—is almost immediate.

On the Road

"I don't know exactly what the payback period would be in any kind of formal cost analysis," says Susan Powe of the Alabama Department of Transportation, "but previously our inspectors had to gather their data on \$3,500 laptops. This year, we'll be giving them \$300 Palms instead. So the payback will be pretty immediate." Powe is referring to the Department's use of Palms running SitePad, the new handheld component of InfoTech's SiteManager PC project management software. The application was beta tested by both the Alabama and Texas Departments of Transportation, and will be rolled out this year to six other states. Ultimately, as many as 700 inspectors will use the devices. Nineteen states now use SiteManager, and most are expected to adopt SitePad as well.

The states funded the development cost of the Palm component, to the tune of \$300,000. The component itself only took about three months to move from initial design meetings to beta testing. It allows field inspectors of road construction projects to collect data on site, without carrying relatively heavy notebook PCs or having to take notes on paper that then have to be transcribed. The result is that SiteManager data is always current, and data



The Alabama Department of Transportation has found that entering inspection data in the field results in less time spent on data entry, along with greatly improved accuracy.



The Alabama Department of Transportation, in association with six other states, worked with InfoTech to develop a Palm companion, SitePad, for the company's SiteManager construction management program.

entry errors have been greatly reduced.

The states chose Palm OS devices over Windows CE or Pocket PC devices because of their longer battery life and the simpler interface of the Palms. The only regret

Powe expressed is that the syncing technique in the current release involves using the MakeZip application to move data to the PC, rather than a normal sync. She hopes this will be upgraded in the next version.

If the Shoe Fits

Famous Footwear is one company that decided to develop its Palm applications internally, using just a portion of its 82 IT staff members to develop an application that can perform price verification, inventory location, and other tasks using Palm Powered Symbol SPT 1740 devices.

Previously, Famous Footwear had handled price changes using a weekly report that was e-mailed to all 930 stores "from Puerto Rico to Guam," says Earl Fischer, Vice President of Information Services/CIO for the company. The sales associates would then spend four hours—six or seven hours if there was a big sale—manually checking and relabeling prices. With the new system, each store has at least one of the Symbol devices, attached via a bay station to a frame relay connection back to the home office. Associates can get pricing for any date desired, simply by inputting the date and scanning the bar code. The system also allows sales associates to locate inventory at any of the company's stores. The interface is a simple web browser, so training costs are low.

"We know we've saved a substantial amount of money using the Symbol devices," Fischer said, "1,800 hours of labor per week at the stores, for one thing. But

it's the quality of the data and the timeliness, the improvement in the pricing accuracy, that's the real payoff. And this comes from an application that literally took us two months to develop in-house."

Clinical Data

St Louis-based

RehabCare Group contracted with Quilogy to develop a Palm OS application to collect clinician data in the field. The system has currently been implemented for the company's nursing home therapists, with 500 locations and 2,000 employees using the application by the end of 2001.

Therapists use a modem at their treatment area to sync their data with the company's SQL data base. This gives them information about the day's patients. As they make their rounds, they enter the amount and type of therapy each patient receives. They sync again at the end of the day, which gives the corporate office billing and payroll information, as well as clinical outcomes. "This system replaced a paper method that used fax machines to transmit the data," reports Jeff Roggensack, RehabCare's Senior Vice President and CIO. "The result is an 80 percent reduction in cost, along with a streamlined process that results in much greater accuracy."

The improved process took just three months to develop, and RehabCare has outsourced the help/support desk function to Ubiquio. Although the system is currently used only in RehabCare's nursing home settings, the company plans to implement the system to inpatient facilities next, followed by outpatient facilities.

Hot Off the Presses

"We got started in a pretty informal way, just to test the feasibility of using Palms to streamline our processes," says Ed Baer, CIO for the Atlanta Journal-Constitution. "We bought three Palm IIIs, downloaded some development tools off the web, and set about to see if we could get them to do what we needed them to." From that simple, ad-hoc beginning, the Journal-Constitution has gone on to develop three major applications in-house that have been implemented using Palm Powered Symbol handhelds.



Famous Footwear's price verification feature was one of the driving forces behind the development of the program, and has resulted in much better pricing accuracy throughout the company.

The first of these is an application for the company's 100-member door-to-door sales force. It provides sales personnel with U.S. Postal Service route walk-sequence information, matched to corporate database information so that information about the various homes' relationship with the Journal-Constitution is at their fingertips. The sales force won't try to sell subscriptions to existing customers, and they can up-sell weekend customers to seven-day subscriptions without being ignorant of the existing subscription. This application has improved the sales force's productivity by 30 percent.

Next, the Journal-Constitution implemented an application to assist in the address-specific delivery of a news-and-advertising product. Previously, each address required printed labels, labels which had to be matched with the products and laboriously hand-sorted. The new application allows the product to be put, unsorted, in the back seat. A dash-mounted Symbol handheld tells the driver where to deliver the product. This application showed a 40 percent return on investment. The third app helps manage single-copy, or newstand inventory, and took one year to develop. "These three applications have been so successful at reducing cost and improving service, that we're now constantly looking at additional ways to use Palm Powered devices," Baer reports.

In the Field

The City of Aurora, Colorado's Building Department had previously used older, less portable devices to collect field data from its building inspectors. The devices took more than three hours to sync with the department's computers, so additional personnel were required to perform syncing operations before and after the daily shift. The new system, rolled out to all 30 building inspectors on Palm IIIxe handhelds, provides twice as much information and syncs in two minutes.

Building inspectors now have the history of previously recorded violations, corrections undertaken, and other data on various properties. Though this obviously results in enormous productivity gains for the department, as well as significant cost savings, that's not what IT personnel believe is the most important attribute of the new application.

"The most significant benefit of the new system is that it provides so much more decision-making information in the field, which results in better decisions," says Larry Hibbs, Application Development Manager.

Going Wireless

One interesting twist used by LinCo Services—a distributor of supplies to restaurants, convenience stores, and nursing homes in Indiana—is to add a Seiko infrared printer that hooks onto a belt. This enables the compa-

Interaction	▼ ARU Test Unit
Crane, Frasier	12/31/01
Bing, Chandler Little, Stuart Mulder, Fox Picard, Jean-Luc Scully, Dana Sisko, Benjamin	
Group	NonPt Review Log

As the clinicians make their rounds at St. Louis-based RehabCare, they enter they day's treatment data into their palms, for billing and payroll tracking.

Facility Review 12/31/01	
Picard, Jean-Luc	
444112225	Plan: 60
<input type="checkbox"/> Group: 75	Need: 39
RESTART	Start: 9:00 am
	End: 9:21 am
	Total: 21
97110-Therapeutic exerc 21 1	
OK	Add Delete Check

The RehabCare application lets clinicians track clinical outcomes and treatment costs for patient procedures.

ny's drivers not only to track deliveries and correct orders on their Palm VII devices, but also to print invoices on the spot. LinCo uses MiniMate software, written by Prism Visual Software, to accomplish these tasks, and expects to achieve a four-month payback of its original investment in the project.

Many of the IT personnel we spoke with want to implement wireless connections, but thus far, few of them had actually done so. Some organizations, such as Baptist Health in Little Rock, Arkansas, do provide means of syncing multiple times daily using IR beaming stations that can sync up to eight Palms simultaneously. But while many organization speak freely of the desire to implement wireless RF solutions, that goal remains largely unimplemented.

One organization that has solved the wireless connectivity problem is Iowa-based Lee Enterprises, a publisher of 23 daily newspapers and more than 100 weekly, classified, and specialty publications. Lee has 800 advertising sales representatives spread across 17 states. Using a Palm OS application developed by Illinois-based 4C Solutions, Inc., Lee has automated the process of ad sales and replaced unwieldy, multi-form ad tickets. Some of the sales force use Palm V handhelds, which must be synced with corporate data through a desktop or by using a modem and dial-up connection. The remainder, however, are equipped with Kyocera QCP 6035 SmartPhones running the Palm OS. These can synch with the corporate AS/400 data base over the cellular connection. More exotic WiFi connections remain a distant goal.

It's clear that Palm Powered handhelds have won a place in enterprises across the country, and that managers and IT departments continue to find new and innovative ways to put them to work. It's not just about size. It's not even just about money, either; it's about giving people new tools to help them do their jobs better.

PocketStudio Professional

Delphi programming for the Palm OS

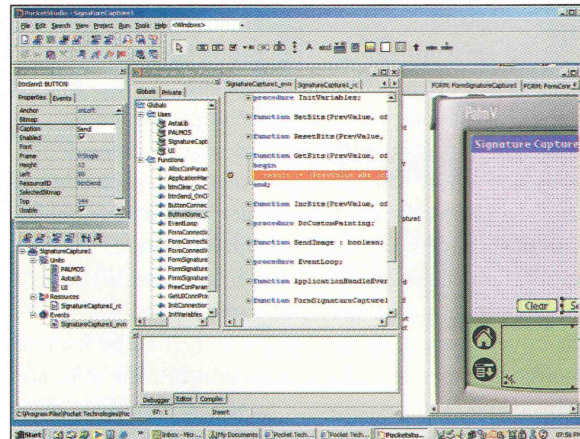
PocketStudio is one of a new breed of development tools for the Palm OS. Similar to AppForge, which lets Visual Basic programmers take advantage of their existing programming knowledge, PocketStudio brings Palm OS programming tools to Delphi and Pascal programmers. This is not to say that this package is limited to experienced Pascal or Delphi users. The development wizards and an easy-to-use programming environment make PocketStudio a great choice for new or experienced programmers.

PocketStudio's IDE (Integrated Development Environment) was designed from the start with the Palm OS in mind. It includes a complete debugger that works alongside POSE, the Palm OS Emulator. You can thoroughly troubleshoot a PocketStudio application by stepping through code and setting

breakpoints. The PocketStudio compiler allows you to create a Palm PRC file that is not dependent on any third-party tools or external runtimes. This makes execution speed faster, and simplifies distribution since there's only a single file that needs to be installed on an end user's device.

The Wizards included with PocketStudio consist of a DB Project Wizard, Shared Library Wizard, and Standard Project Wizard. The DB Project Wizard walks you through the steps required to create a complete Palm OS database program, including the creation of a conduit for synchronization of a backend database. By itself, it creates a nearly perfect database application that you can customize as you need. Regardless of the type of project you are developing, each of the Wizards will create a basic framework for the three types of programs.

Once a basic framework has been created, you proceed to drag-and-drop objects onto a mock Palm device to design a GUI for your application. PocketStudio utilizes a simple event-driven method of programming. That is, the objects you use to create your GUI are programmed by the events that happen to them, such as a button being pressed. A whopping 50 example programs are included with the package; these help tremendously with learning the Palm OS API. Examples are included for specific hardware platforms, such as the Sony Clie, Kyocera Smartphone, Handera 330, and Symbol handhelds. Libraries are also included to support TDK's Bluetooth adapters for the Palm V and m500 series.



The IDE is easy to navigate and customize.

If you encounter problems building a Pocket Studio application, there is a wealth of information available on the Pocket Technologies online message boards, which are frequented both by Pocket Technologies staffers and fellow developers. We found most queries received quick and useful responses. The company also offers online "eSeminar" training sessions in conjunction with Infocan Management; a version of the package with training included in the price sells for \$249.99.

For entry-level users, Pocket Technologies also offers a stripped down version of the compiler, PocketStudio Standard, for only \$59.99. This version lacks a number of features, such as shared library support, the ability to create applications larger than 32K, and the conduit creation wizard.

Whether you're interested in converting existing Delphi applications to the Palm OS or you simply prefer Pascal to C, you'll find PocketStudio a capable and well-designed development tool.

—Clayton Crooks

CONTACT:

Pocket Technologies
www.pocket-technologies.com
Requires: Windows 95 or higher
Version tested: 1.1
Price: \$199.99

THE GOOD:

Excellent IDE, generates code comparable in size and speed to C compilers.

THE BAD:

Little third-party info available for Pascal programming on the Palm.

VERDICT:

One of the best RAD tools available for the Palm OS.



Palm i705

The best darned business tool Palm has ever designed

Looking for a Palm-powered PDA that's absolutely revolutionary? You might want to wait until the fall, when devices running OS 5 start hitting the street. Or look to Sony, who seems to have a flair for the revolutionary these days. But if you can accept Palm's i705 for what it is—a carefully-balanced blend of evolutionary features—you'll find the best darned business tool Palm has ever engineered.

Palm has called the i705 a "connected organizer," and that's a pretty apt description. Think of it as an m500 with an integrated wireless modem. One thing it certainly isn't: a cell phone. Unlike Handspring's Treo, which was released about the same time and was reviewed in our last issue, the i705 has no voice capabilities. Instead, it's a Palm VII that has been updated with contemporary m-series technology and a slew of enterprise-savvy capabilities.

m500 Roots

Visually, Palm seems to have started with the m500 and rounded all of the sharper edges, ending up with a smoothly-contoured, industrial-looking design that almost resembles a Star Trek data pad. The integrated antenna is housed in an angular white plastic roof—there's no flip-up antenna—which also houses a colored LED that can silently alerts you to network status, new messages, and impending appointments.

The i705 is very much an m500 on the inside as well. It sports Palm OS 4, a 33MHz DragonBall processor, 8MB of RAM, a grayscale screen, integrated rechargeable batteries, and is fully compatible with the m-series universal connector. There's a familiar SD expansion slot on the right side

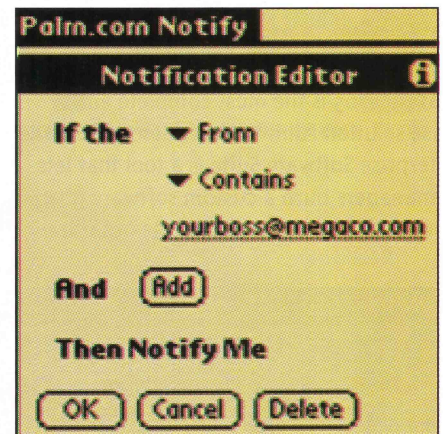
for adding memory and small peripherals (like the new Palm Bluetooth networking card). The box includes a HotSync cradle and AC adapter. Thankfully, the addition of wireless features and integrated batteries hasn't made the i705 uncomfortably large. Just .6-inches thick, it's somewhat bigger all around than an m500, and roughly the same size as a Handspring Visor—but thinner and certainly more attractive.

Wireless Messaging

Visuals and specifications aside, it's the wireless messaging that makes the i705 unique. The organizer comes in two flavors: an over-the-counter consumer version and an enterprise model that corporations can deploy in an organized rollout to their road warriors. The enterprise version can be configured such that new email messages are automatically pushed from the mail server directly to the i705. There are two ways to do this. The Palm Wireless Desktop Server sits behind the corporate firewall and connects the mail server to the fleet of i705s; as email arrives on the server, a copy is encrypted and transmitted to the appropriate device. What if your IT department won't buy a fleet of i705s or doesn't want to invest in the Wireless Desktop Server? That's where the Palm MultiMail Deluxe Desktop Link comes in. The Desktop Link is a free application, available on the Palm Web site (but not, oddly, included in the box on the installation CD-ROM) that sits on your desktop PC. It intercepts incoming mail from the Microsoft Exchange server and sends an encrypted copy to your i705.



A red flashing light alerts you when email arrives.



You can customize the notification feature to let you know when you receive email from particular addresses.

That's the corporate picture. If you have a typical home PC, don't look for push-email. In order to receive messages on the road, you need to close your mail client on the home PC so mail accumulates at your ISP's server. Then you need to press

a button on the i705 to retrieve a copy of your messages.

MultiMail Deluxe is an excellent mail client. You can retrieve entire messages or just the headers, and a powerful filter system lets you conserve your online time. You can choose to ignore messages from mailing lists, for instance, or only get messages from certain senders. Since the filters aren't on the desktop, you can change your filtering criteria at any time, even after you leave the office. Thanks to a large set of document plugins, MultiMail can also download and display a wide assortment of attachments, such as Word, Excel, and graphic files.

On the Web, you'll find the i705 is reminiscent of the Palm VII. The MyPalm portal delivers links to many common news and information services, and you can surf directly to specific URLs. But there's no bookmarking like a real Web browser might offer, and Web clipping apps are still the preferred mode of Internet transportation.

Enterprise Targeted

If you're a system administrator, you'll find that the i705 is the most complete enterprise solution Palm has ever assembled. The Enterprise Software Suite is a tool that lets IT managers burn a custom software image onto each and every i705 in the organiza-

The i705 features SD/MMC expansion and Palm's proprietary Universal Connector.

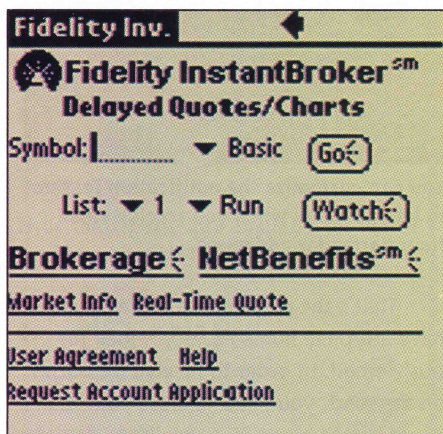
tion via an SD memory card. The SD card must be inserted into each device to enable the wireless capabilities, and that gives administrators an ideal opportunity to push CRM solutions, standard corporate software, and other third party applications onto the device at the same time. Unfortunately, there are no controls to prevent users from installing unauthorized software—that will have to wait for the security features of OS 5.

The i705 is an elegant PDA. Because of the wireless features, there are a lot more

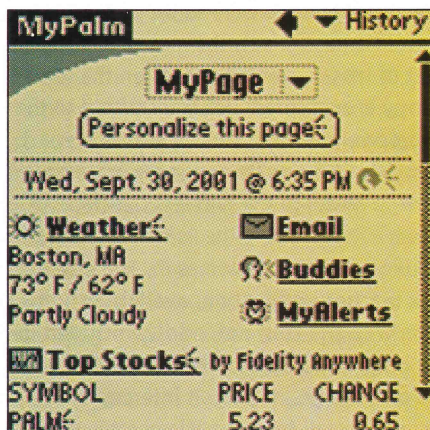
"core" applications in the i705 than on older handhelds. The Calendar and Address Book are still where they've always been, but the To Do and Memo Pad buttons have been replaced by the MyPalm Web portal and MultiMail Deluxe. Press MultiMail once to access the program; press and hold the button to check messages. The silk-screened Calculator button is gone, replaced by a star icon. That's a user-programmable button that you can assign to your favorite app. Just like the m-series devices, the Graffiti zone is still flanked by Time and Contrast controls. Palm has also hit its stride with the backlight, which is highly readable and no longer an unappetizing shade of radioactive green.

The i705 represents perhaps the best that the DragonBall and OS 4 have to offer. In addition to an excellent wireless Web solution, this elegant handheld features an ergonomic design, a great greyscale screen, and a smart collection of software. Conspicuous by their absence, though, are features like color, 16MB of RAM, a Clie-like jogwheel, and some sort of push-email for non-Exchange users. If you can live with those limitations, the i705 is the best we'll see until OS 5 emerges from the laboratory.

—Dave Johnson



The i705 can run any of the Palm VII PQA web clipping applications.



You can set up the customizable start page with regional information.

CONTACT:

Palm
www.palm.com
Price: \$449; Wireless service plans vary from \$20-\$35 per month

THE GOOD:

Excellent push-email; attachment viewing; attractive design.

THE BAD:

Only 8MB RAM; no color screen.

VERDICT:

A compelling PDA for users who want data but not voice.



Palm Mini Keyboard for the i705

Giving Graffiti the thumb

While Graffiti is great for short text entries, there is nothing like a keyboard for accurately composing email or responding to Instant Messages. Palm's Mini Keyboard for the i705 gives you the advantages of keyboard entry without significantly adding to the handheld's bulk.

The Palm Mini Keyboard fits snugly around the bottom of the i705, covering the entire Graffiti area. Since you no longer have access to the i705's buttons, replacements are included on the keyboard. Each letter key also contains a second symbol, in blue, that can be accessed via the Mini Keyboard's function key.

An important feedback tool for improving typing accuracy and speed is the keyboard's click. The Palm Mini Keyboard provides an audible click with each key press. Key combinations can be used to create shortcuts for using menu and software commands. While the Palm Mini Keyboard manual lists several shortcuts, a more extensive list can be found on Palm's support website.

The original software driver for the mini keyboard contained a bug that regularly turned the i705's power on. This bug has been fixed, so be sure to download the most recent driver for the keyboard from Palm's website. If you also use the folding Palm Portable Keyboard, you can have both drivers installed and active simultaneously.

The Palm Mini Keyboard comes with a travel bag and a plastic insert to protect the keyboard's connector when it's not in use. The Palm Mini Keyboard makes the i705 a truly mobile messaging solution, and it has the added benefit of hushing the bragging of your Blackberry-using colleagues.

—Bob Eller



The Palm Mini Keyboard offers a compact alternative to stylus input.

CONTACT:

Palm
www.Palm.com
Requires: Palm i705
Price: \$59.95

THE GOOD:

Lets you input text in situations where the Palm Folding Keyboard isn't practical.

THE BAD:

Shortcuts are not fully documented in the accompanying manual, and are unevenly implemented.

VERDICT:

A good alternative if your Graffiti is less than perfect.



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Palm MarketPlace

Quartus Forth

Alternative language development right on your handheld

When considering Palm OS development tools, most people think of the Integrated Development Environments (IDE) that reside on a desktop PC. However, there are a few alternatives that allow you to create applications directly on your handheld. One such development tool is Quartus Forth, which offers a fast compiler, an interactive debugging and testing environment, and provides access to the complete Palm OS API.

As a language, Forth has been around for about 30 years, and while it has never gained a great deal of popularity compared to languages like C/C++ or BASIC, it is ideally suited for embedded systems where only a small memory and storage space exists. When many languages have been ported to run directly on the Palm OS, they

are often watered down or simplified. This isn't the case with Quartus Forth, which is a complete ISO/ANSI standard implementation of Forth that can be compiled into the processor's native code, offering access to all of the Palm's API functions.

One of the problems with using Forth as a development language is the fact that it isn't regularly taught in colleges or universities. Additionally, while it has many excellent features, it has never achieved the popularity of many other languages, so supporting documentation and sample code isn't as common.

The HTML manual included with Quartus Forth is some help, but unless a developer has some experience in the language, there is a substantial learning curve required to use it. Quartus offers Acrobat PDF versions of the compiler's documentation and Forth standards on its web site, along with some tutorials and sample code. The Quartus manual focuses its attention on creating applications for the Palm OS, but is severely lacking in its coverage of the Forth language.

The development tool resides completely on the Palm OS device. It only makes sense that a portable development environment would exist for a mostly portable machine. When you execute Quartus Forth on your device, you are given a command line window to access the compiler system. While this seems like an ideal way to develop, the portability of the tool also has its dangers. If you make a mistake in your code while testing API calls, your handheld make become unstable or require a reset.

To write the source code for an application, you can use any Palm OS program that will create Memo Pad or DOC files, or

Quartus

Welcome to Quartus Forth 1.2.1U.

Build: 1999.03.06 2:18:37pm

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All rights reserved.

Evaluation version.

Quartus Forth's simple command-line interface runs directly on your handheld.

create them on your desktop computer and use Memo Pad to transfer them. You then open the Quartus Forth compiler and instruct it to include the file using the command line interface. The compiler will search for other files that are used by the source and automatically include them.

You can add many types of resources to a Quartus Forth application, such as forms, menus, and bitmaps, but the resource database will need to be created using a different tool like PilRC or Quartus' own RsrcEdit. When you have finished an application, you can create a royalty free standalone PRC file that can execute without a runtime. An evaluation version can be obtained from the Quartus web site.

Quartus Forth's applications are small and speedy, and you may appreciate the ability to work on code directly on your handheld during free moments. Just be aware that there are fewer reference resources available than with more common languages.

—Clayton Crooks

CONTACT:

Quartus

www.quartus.net

Requires: Palm OS with 90k free space

Price: \$69.96

THE GOOD:

Very fast execution speed of compiled program, portable development environment.

THE BAD:

Less reference material available than for other languages; programming errors can result in a handheld reset.

VERDICT:

A fringe language, but a speedy option if you want to develop on the road.



Anagram

Turn email into contacts, appointments, and notes with a keystroke

It's the small stuff that eats into your productivity every day, like reading email and transferring the relevant information into your Palm.

There are a few tools, of course, like AddressGrabber, that try to automate the job of re-entering data, but in general they tend to be more trouble than they're worth. Textual's Anagram may finally get it right.

Anagram is an intelligent text parsing program that tries to interpret the intent of a text message and create logical appointments and contacts from it, either within Palm Desktop or Microsoft Outlook. Suppose you get an email message that says, "Let's meet at 12:30 on Wednesday for lunch," for instance. Send that text to Anagram, and the program will quickly build an event within Palm Desktop for half-past noon on the nearest appropriate Wednesday. When it works, it seems like magic.

And, believe it or not, it works quite well most of the time. There are two versions of Anagram: one for the Palm Desktop, and another for Outlook. We tested the Outlook version more rigorously, though both programs work very much alike. Once installed, Anagram sleeps in the Windows System Tray until called upon by a keyboard shortcut. When you see text from any source (such as email, a Word document, or a Web page) that you want to import into your desktop information manager—and thereby into your handheld—just select the relevant information and press the shortcut key. By default, Anagram responds to a double Control-C, though there are other options. Anagram parses the text and pours it into Outlook or the Palm Desktop, where you can then edit it, move things around if need be, or simply save the entry.

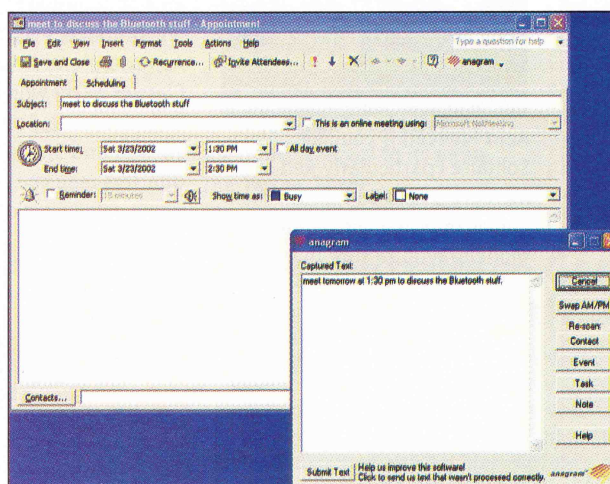
Anagram isn't Arthur C. Clarke's HAL 9000, though, and needs to be fed data in small, relevant doses. If you want to build a contact from the signature text of an email message, for instance, selecting the entire message will end in failure. If you carefully select just the signature, though, odds are good that Anagram will build a contact entry that's 99 percent accurate. If it reversed the person's job title and company name or switched the home and business telephone

numbers, though, fear not: Anagram provides a few one-click fixes to repair those kinds of common mistakes before you save and close the entry.

Unlike some of Anagram's predecessors, you don't have to tell it where to put the selected data; the program can figure out on its own whether the text should become an appointment or an address. When it's totally stumped—such as if you copy a paragraph of text from a Web page and intend to turn it into a Note—Anagram displays the text in a dialog box and waits for you to tell it where to put the information. There's even a button on the program's main interface to send improperly-translated text directly to Textual so the company can improve the program's performance in future releases. Indeed, Textual was readying a new version of Anagram when we went to print that should offer a slew of new features, including better text handling.

Let's be honest: Anagram won't shave hours off your day. On the other hand, it makes a task that simply has to be done—transferring the contents of daily emails to items on your Palm—much less wearisome. In the process, it may also cut down on the bad phone numbers and missed appointments that arise from human transcription errors. Anagram does its job well, and deserves a place on your desktop.

—Dave Johnson



The Anagram dialog box has a palette of buttons for quick-changing data that ended up in the wrong place.

CONTACT

Textual

www.getanagram.com

Requires: Windows 95 or higher, Palm Desktop 3.0 or higher or Microsoft Outlook 97 or higher

Version Tested: 1.0

Price: \$16.95; \$5.95 for second PC

GOOD

Fast, efficient, and prone to few errors.

BAD

It can't read minds—yet.

VERDICT

A must-have tool for people who create lots of contacts and appointments from email.



Killer Color

A dozen glorious games to while away those lazy summer days.

By Rick Broida

***Sure,** you could have saved a few bucks and bought yourself a grayscale model. But then you got a look at Bejeweled in color and said, "Life is short, budget be damned." So now that you've sprung for an m515, Visor Prism, Sony Clié or some other color model, it's time to stock up on games that really take advantage of the screen.*

Astraware's Bejeweled is a given—if it didn't already come loaded, we're sure you've installed it by now. But don't miss these other engaging games, all of them great for killing time—and making grayscale users jealous.

Resources for Gamers

On the prowl for new and exciting games? Look no further than these software-packed sites.

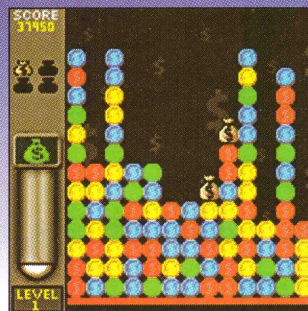
FreewarePalm //
www.freewarepalm.com

PalmGear //
www.palmgear.com

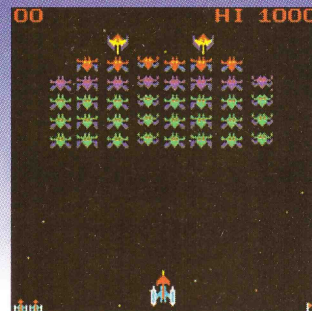
Palm Gaming World //
www.palmgamingworld.com



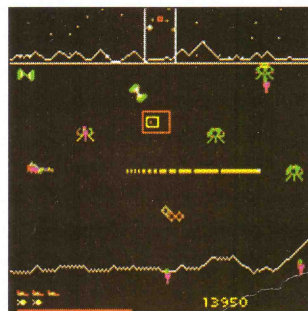
Acid Freecell If you like Solitaire (particularly Red Mercury's Acid Solitaire, which comes bundled with some Clié models), you're sure to love Acid Freecell—one of the game's most popular variants. It's as colorful as a card game can be, and just plain fun to boot.
Red Mercury
www.red-mercury.com



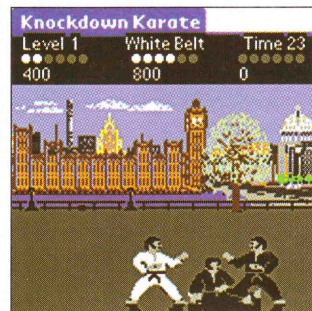
Big Money Nearly as addicting as Bejeweled, Big Money challenges you to zap groups of like-colored coins before they pile up too high. It's really just a money-themed variation on the "classic" game Bubblet, but a great one with multiple skill levels, bonuses, configurable sound effects and, of course, Astraware's trademark gorgeous graphics. **Astraware**
www.astraware.com



Galax Speaking of arcade classics, most coin-op jockeys would agree that few games rivaled Galaxian. Galax faithfully recreates it for your hand-held PC, with all the dive-bombing alien invaders you loved blasting in your youth. Oh, and if you were fond of Frogger, you'll find a pleasant surprise at this developer's site. **Pilotfan**
www.pilotfan.com



Defender II If you have fond memories of pumping an endless stream of quarters into the Defender machine at your local arcade, you'll love this perfect recreation. It's part of Astraware's Midway Arcade Classics pack, which also includes Joust, Root Beer Tapper, Sinistar and Spy Hunter. No quarters required! **Astraware**
www.astraware.com



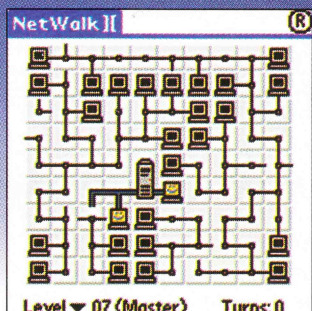
Knockdown Karate Gamers who cut their teeth on the Commodore 64 may recognize this action-packed fighting game, which brings button-mashing to a whole new level. Punch and kick your way past wave after wave of enemies, using 14 different moves and attacks. Ki-yaa!
Nordcreations.com
www.nordcreations.com

Our Editor's Favorite Games

Rick Brioda:	NetWalk	www.beiks.com
Denny Atkin:	Bejeweled	www.astraware.com
Ben Sones:	Kyles Quest 2	www.crimsonfire.com
Calvin O. Parker:	TextTwist!	www.astraware.com
Dave Johnson:	Collapse	www.astraware.com



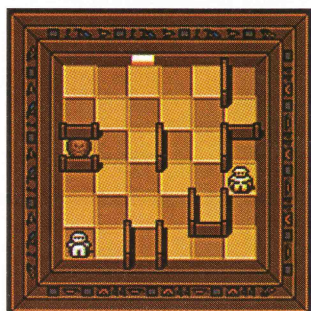
Monopoly Boardwalk, Park Place, the railroads—they're all there in Handmark's excellent implementation of the classic boardgame. Play alone against up to three computer-controlled opponents, or mix in some humans for a real challenge. Best of all, the computer handles the job no one wants: banker! **Handmark**
www.handmark.com



NetWalk For most folks, the idea of wiring a computer network has the same appeal as a root canal. But in NetWalk, it's addictive puzzle fun. The goal is to get every computer on the screen attached to a server by rotating connection cables. It's not even all that colorful, but what an endlessly entertaining game. **Beiks, Ltd.**
www.beiks.com



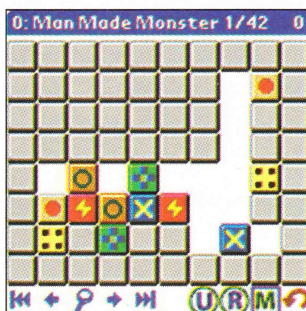
Vegas Blackjack Cheaper than a trip to Nevada and free of secondhand smoke, Vegas Blackjack makes you feel like you just sat down at a casino table. The game is replete with realistic options, like insurance and split hands. If Blackjack isn't your cup of chips, the company also offers Vegas-caliber slot machine and video poker games. **Electron Hut**
www.electronhut.com



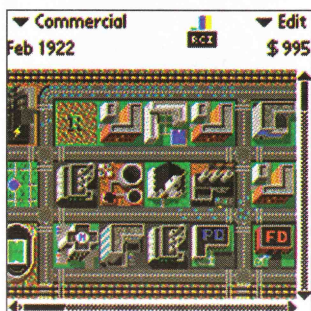
Mummy Maze From the folks who brought you Bejeweled (yes, we mention it a lot, but what can we say—it's the standard), Mummy Maze is one of those killer puzzle games that's easy to play but tough to beat. Guide your intrepid explorer out of the tomb before the mummy catches him! **Astraware**
www.astraware.com



Siberian Strike Destined to make Game Boy owners jealous, Siberian Strike is a visually stunning arcade shooter. As the pilot of a World War II fighter, you must blast through wave after wave of enemy planes and tanks. If you have an itchy trigger finger or an eye for eye candy, this is the game for you. **Ludigames**
www.siberianstrike.com



Vexed Arguably the best free-ware game in existence, Vexed challenges you to eliminate all the blocks on the screen—kind of like Tetris, but it's played at your own pace. The game includes seven level packs with a whopping 400 levels, including a collection designed especially for kids. Player beware: the game lives up to its name. **The Vexed Team**
<http://vexed.sourceforge.net>



SimCity Yep, it's *that* SimCity—the classic PC game of yesteryear. This faithful adaptation plays exactly like the original: build your city, balance the budget, monitor its progress, and, hopefully, keep your job as mayor. A word of caution: it's just as addicting as you remember. **Atelier Software**
www.ateliersoftware.com

Game Gear

Your handheld's buttons are no substitute for real arcade controls—a fact that's sure to become evident as you fire up games that require a lot of button mashing. Fortunately, third-party developers have come to the rescue with accessories that bridge the gap between PDA and Game Boy.

GameFace / Handspring
www.handspring.com

A snap-on faceplate for Visors that provides a joystick and two large buttons.

GamePad / World Wide Widget Works
www.palmgamepad.com

Game Boy-like controller that snaps onto the bottom of the Palm III and Palm VII series (and the Palm V, with an optional adapter).

SnapNPlay / TT Tech
www.tt-tec.com

This Visor-only controller also provides Game Boy-style controls, but with the added bonus of Shock Vibration Technology (it vibrates during your games).

Q-Pad / Simple Jet Technology
www.simplejet.com

Yet another snap-on Game Boy-esque controller, this one available for virtually all Palm OS devices (including the Palm m100 series and Sony Clie series).

5 Must-Have Games for Grayscale Screens

Who says the color crowd gets to have all the fun? If you're still getting by with grayscale, there are plenty of great games you can enjoy. NetWalk and Vexed, from the color list, should be high on your list. But check out these others as well.

Bubble Puzzle Great adaptation of "shoot-the-bubble" classic www.palmgear.com

Patience A whopping 15 different Solitaire games, and it's a freebie! www.palmgear.com

Pocket Chess Deluxe Full-featured chess game. www.pocketexpress.com

Space Trader Freeware strategy game with a space-trading theme. www.palmgear.com

Tetris Classic The puzzle game that launched a thousand variations. www.pocketexpress.com

CONTACT

Global Star Software
www.globalstarsoftware.com
Requires: Palm OS 3.5 or above. Grayscale requires 4 MB to run, Color version requires 8 MB
Version Tested: 0.24
Size: 2.5 MB
Price: \$19.99

GOOD

A fun, technically impressive first person shooter for your Palm.

BAD

Palm controls are barely adequate, lousy audio.

VERDICT

A nice diversion considering Palm hardware limitations.



Serious Sam

Need a little more action on your Palm? Then Get Serious

The PC version of Serious Sam is a first-person shooter that reveled in its 3D engine's ability to plaster the screen with hordes of villainous monsters. The Palm OS version doesn't compare to its big brother, but it's definitely one of the most graphically advanced Palm games out there.

The premise is simple. You are Serious Sam, a super soldier sent back in time to ancient Egypt to battle evil aliens bent on destroying the Earth. To that end, Sam finds pistols, machine guns, and rocket launchers, plenty of ammo, and health power-ups scattered around the 15 impressively large levels. Aliens might not come at you in endless hordes, but the game manages to make sure that bad things come in small groups, and avoiding enemy fire using the Palm buttons is something of an experience.

The gameplay is actually well done, considering the limitations of the Palm control setup, but side-stepping and shooting at the same time will likely prove to be too much for most casual

gamers. That aside, it's easy enough to move Sam around the various desert, dungeon, and pyramid levels. Both the arenas and monsters look grainy but detailed (particularly in the color version). Sound effects and music are minimal and generally unimpressive.

For Palm owners looking for something filled with action and more complexity than a simple shooting gallery game, Serious Sam is definitely going to fit the bill. It's surprisingly fun, even if the control takes a lot of getting used to.

—Jason D'Aprile



A little 3D shooter action for your handheld.

CONTACT

Iambic
www.iambic.com
Requires: OS 3.5 or later; color screen
Version Tested: 1.01
Size: 233K; Price: \$19.95

GOOD

Fast-action physics, dazzling graphics, superb sound effects; two tables included; surprisingly small.

BAD

Constant scrolling a little awkward; requires color.

VERDICT

The best-looking Palm OS pinball game to date.



Bump Attack A totally wizard pinball game

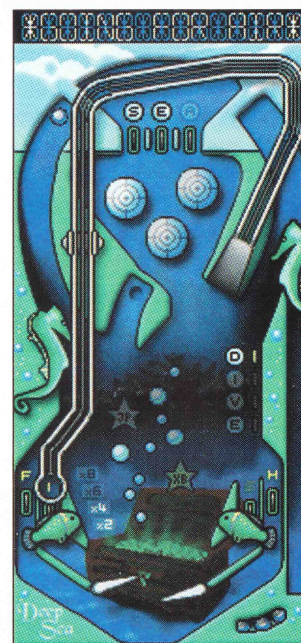
Until now, pinball games for the Palm OS have all faced the same challenge: how to squeeze a realistic, full-length table onto a small square screen. Iambic has developed an intriguing solution: a "virtual" table that scrolls up and down with the movement of the ball, beyond the confines of the screen. The result is a pinball game that feels a bit different than most, but still delivers an arcade-caliber experience.

The most striking aspect of Bump Attack is its look: two gloriously colorful and detailed tables, with a digital "LCD" showing scores, bonuses and other info at the top of the screen. The tables—DeepSea and Mars—have ramps, sink holes, targets, score multipliers, and all the other goodies that make pinball fun. However, you see only about half of the table at any given time, and the constant scrolling makes it difficult to aim your shots. Pinball purists may find this unacceptable—but there's no denying the game is fun. It's amazingly fast, and the ball physics seem impeccable. Iambic earns extra credit for the varied and lively sound effects, which surpass most Palm OS games we've

played—pinball or otherwise.

You need a color handheld (like the Palm IIIc, Visor Prism or Sony Clie N760C) to play Bump Attack—it's one of those rare games that doesn't have a grayscale counterpart. That's regrettable, as the graphics are definitely detailed enough for enjoyable gray-play. But for the color-equipped, there's finally a pinball game that'll make you go tilt.

—Rick Broida



A scrolling playfield makes Bump Attack play much more like traditional pinball.

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CONTACT

Simple Jet Technology
www.simplejet.com
Requires: Clie N-series
handheld (other versions
available)
Price: \$32.47

GOOD

Reconfigurable controls.

BAD

Design looks a bit cheap.

VERDICT

A must-have for action
game fans.



Q-Pad Finally, decent gaming on the Clie

Despite the oddly-accented é in its name supposedly standing for "entertainment," the Clie is a difficult machine to play action games on due to its poor button design. Simple Jet Technology's Q-Pad solves this by adding a four-way thumbpad, in addition to four fire buttons.

The included driver is fully configurable, so you can program the buttons for virtually any game. You create three different presets, making it easy to swap between configurations for different games. Because the driver emulates the Clie's application buttons, no special support is required in the games you play.

The Q-Pad simply snaps onto the bottom of the Clie. A few small foam pads are included that can be attached to the inside of the controller to insure a snug fit. The controller looks a bit cheap, but our test unit has held up well after numerous long gaming sessions.

Note that the Q-Pad works with the N-series Clies—the N610C and N710C/N760C. We hope to see a T-series version in the future, since the up/down

rocker on those makes gaming difficult as well. Although we didn't test them, Q-Pad versions are now available for the Visor Prism, Deluxe, Platinum, and Neo; the Palm III, m100, and m105; and even the TRGPro.

—Denny Atkin



The Q-Pad gamepad solves the problem of the Clie's gaming-hostile buttons.

CONTACT

Crimson Fire Entertainment
www.crimsonfire.com
Requires: PalmOS 3.0
Version Tested: 1.3
Size: 382K (plus 200K free
memory) Price: \$20.00

GOOD

A slick color remake of the
original with better combat
and more options.

BAD

Only a few small levels
available... for now.

VERDICT

An entertaining, expand-
able RPG.



Kyle's Quest 2 If he builds it, they will come

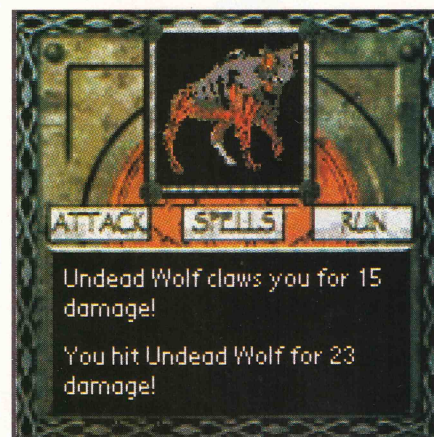
The original Kyle's Quest's, in all its two-color role-playing glory, has long been a staple of handheld gaming. With simple but elegant mechanics and lots of community-created content, it still weighs in as one of the best bargains on the platform. Now it's joined by a slick new sequel that is better in just about every way... except in quantity of content.

The tutorial level that comes with Kyle's Quest 2 features one tiny town, one tiny wilderness area, and not a whole lot else. It's a good introduction to the game, but not much of a game in and of itself. Fortunately there are already a few user-made levels available on a well-hidden page in the Crimson Fire website; go to www.crimsonfire.com/dev/list.php to get the goods. Unfortunately, not all of the levels work with the current version of the game.

Not to worry—you're in this for the long haul. If the community support for the first game is any indication, that's a good investment. With its rich array of built-in scripts and a user-friendly interface, Kyle's Quest 2 excels as a development tool, and you can even test your skills at level design with the free editor. Check out Poole's Starcraft "proof of concept" level for a taste of the possibilities.

That's all in the future, though. For now, Kyle's Quest 2 is more a game construction set than an actual game. It's easily the best game construction set out there, however, so it's a good bet that the content will come with time.

—Benjamin E. Sones



Combat is simple and elegant.

Ultimate^{Gamer's} Guide Directory

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ASTRAWARE

Dragon Bane II



www.mythological.com

Selected Accolades:
 gear's choice! | ZDNet | TOP PICK | pioneer excellence award | GOLDEN PALM AWARD | PDA Awards Perfect 10


New game engine with dozens of new features to provide for a richer, more interactive role playing experience.

"Even if you're only marginally interested in the RPG genre, Dragon Bane is a must have!" -Pen Computing

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 smooth animations
 amusing effects

www.beiks.com
 code: hhmedia

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 PINBALL

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www.iambic.com
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 14 more Palm Applications!

iambic
 Advancing your handheld experience

Ultimate Gamer's Guide Directory

AcidFreecell

Red Mercury

www.red-mercury.com

FreeCell Solitaire On Crack! Color Backgrounds, High Res Graphics, Eleven Statistics, And Win Streak Fireworks!

AcidSolitaire

Red Mercury

www.red-mercury.com

Full Featured Solitaire with Color Backgrounds, High Res Graphics! Eleven Statistics, Win Animations And More!

Atom Smash

Red Mercury

www.red-mercury.com

Smash 'Em! High Speed Color Action, High Resolution Graphics! 64 built-in levels. Free Additional LevelPaks!

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Electron Hut

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Solitaire games, Arcade games, Puzzle games, and more...visit our web site for free demos!

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DeepNet Technologies

www.handheldblackjack.com

Instructional programs to learn Blackjack Card Counting techniques and Basic Strategy

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Astraware

www.astraware.com/palm/shooting/

Let out your tension with some target practice with Astraware's collection of *Galaxy Ranger*, *Police Range* and *Bang! Bang!*

Palm Games Pack 2001

Astraware

www.astraware.com/palm/pack/

Featuring the critically acclaimed *Zap!2000* shoot-em-up, popular newcomer *Biplane Ace* and old favorite *Bzzz!*

PopCap Pack

Astraware

www.astraware.com/palm/popcap/

5 Great Puzzle Games! Includes the fiendishly addictive *Bejeweled*, *Mummy Maze*, *Seven Seas*, *Alchemy*, and *Atomica*! Color and grayscale versions.

Shanghai Pocket Essentials

LandWare, Inc.

www.landware.com/shanghai

The classic Activision Mah-Jongg game for your Palm Powered or Pocket PC handheld.

Zap!2000

Astraware

www.astraware.com/palm/zap2000/

The Best Arcade Action on the Palm! All the best features you could want in a shoot-em-up game. Color, grayscale, and Visor Prism versions.

REVIEWS

CONTACT

John Wiley & Sons, Inc.

www.wiley.com

Price: \$27.95

GOOD

Strong focus on Hawkins, Dubinsky, and the early days of Palm; a genuinely compelling story.

BAD

Virtually no commentary from developers and others who hitched their wagons to Palm's star.

VERDICT

Rates among the best tales of Silicon Valley start-ups and strategies.

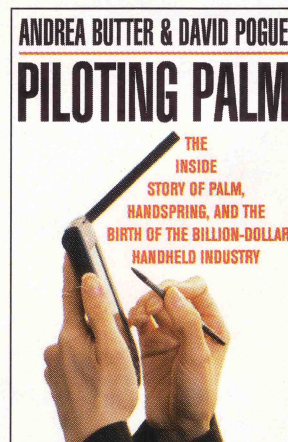


Piloting Palm The untold story behind the birth of the Palm platform

One of the most telling moments in *Piloting Palm: The Inside Story of Palm, Handspring, and the Birth of the Billion-Dollar Handheld Industry* comes near the end, when Palm finds itself competing with its own licensees—and having to support them at the same time. "The company became practically schizophrenic," writes former Palm marketing director Andrea Butter, who penned the tome along with New York Times columnist David Pogue. "Palm's sales and marketing people competed with Palm's licensees for customers—yet Palm's programmers were forced to write new features for the benefit of Palm's new rivals."

Welcome to the short, rocky, often disastrous, and thoroughly compelling history of Palm Computing and the handheld PC business it pioneered. Narrated by Butter, who (wisely) only occasionally interjects herself into the story, *Piloting Palm* reveals the seemingly endless stream of roadblocks, setbacks, and twists of fate that plagued Palm founders Jeff Hawkins and Donna Dubinsky as they endeavored to bring their vision to market, then keep it from suffocating under the weight of corporate meddling.

Though Butter's "insider" status might suggest a rah-rah-Palm exposé, she and Pogue deliver the story with journalistic objectivity, incorporating a steady stream of quotes from all the major players—Hawkins, Dubinsky, and executives from 3Com and U.S. Robotics among them. The book also presents a richly detailed history of the PDA market, both prior to Palm's emergence and concurrent with its rise. In the end, you'll have a much greater understanding as to how and why Palm and Handspring evolved as they did—and new-found appreciation that they evolved at all.



A must-read for handheld aficionados.

—Rick Broida

Parlay Dialer Autodialer

Simple phone dialing from your handheld

Imagine how nice it would be if you could simply point your handheld at a telephone and make it automatically dial any number in your Address Book. Well, stop dreaming, because the Parlay Dialer Autodialer from Synchroscan turns all of your fantasies into reality. Well, just the fantasies related to beaming telephone numbers, at least.

The Autodialer is a small infrared receiver that plugs into your home or office telephone and intercepts beams from your Palm. Beam an Address Book entry toward your phone, and it dials the associated phone number. It's as simple as that.

We were surprised at just how easy it is to install the Autodialer. It attaches to your phone much like an answering machine, and comes with a short length of phone cord to make the connection. The Autodialer runs on a pair of AAA batteries, and though we had to remove a pair of screws to get to the battery compartment, Synchroscan actually includes a small screwdriver right in the box.

Best of all, there are no drivers to install on the PDA itself. To finish the install, you need to beam your area code to the Autodialer so it knows how to distinguish between local and out-of-area calls. You can also program it to dial a prefix like 1 or 9 if necessary—after that, it's ready to dial.

Parlay recommends changing the Palm's preferences so a single upstroke across the display starts the beaming process (that's something you can configure in the Palm's Prefs program), and that does make dialing effortless: just find an Address Book entry, point your PDA at the Autodialer, and beam. A green light on the top of the Autodialer indicates it received the beam successfully, and you can then pick up your handset or turn on the speakerphone to complete the call. The Autodialer stays ready to dial for about a minute—if you wait too long before picking up the receiver, just press a button on the device to wake it up again.

The Parlay Dialer comes with software you can install if you want to—but it's by no means necessary. AddressIR, for instance, is a free replacement for the Palm Address Book that lets you choose which of the five possible phone numbers to beam to the Autodialer. Without AddressIR, the Autodialer simply dials the first number in the list, and you'd need to

create separate Address Book entries to beam any of the other phone numbers. PhoneMate costs an additional \$20 to register and has a variety of additional features for quick lookups, SMS messaging, and Palm-powered smartphones.

The Autodialer seems bulletproof. It works in areas that require ten-digit dialing and on hotel phones. It can dial numbers that appear in your Address Book with extra data, so a phone number of 719-555-1212 EXT 123 rings though just fine (though Autodialer ignores the EXT 123). Unfortunately, it's a bit expensive. Would we buy the Autodialer for \$60? Only if we spent a lot of time on the phone. It would be a no-brainer for half the price. And while the 3-inch square-by-one-inch high box isn't terribly large, we suspect the circuitry would have easily fit in half that space.

If you are always looking up phone numbers on your Palm to make calls anyway, the Autodialer may be the perfect accessory for your desktop. And though Synchroscan got almost everything right, we think they miscalculated on the price. Unless you make quite a few daily calls, you may think twice about spending \$60 to get your Palm to dial for you.

—Dave Johnson

CONTACT

Synchroscan Corporation
www.pdazphone.com

Requires: Any Palm-powered device with IR port

Price: \$59.95

GOOD

Easy set up; no Palm OS software required.

BAD

A bit expensive.

VERDICT

A clever way to use the Palm's Address Book at your desktop.



An easy to install, effortless to use dialer.

CONTACT

Palm
www.palm.com
Price: \$399

GOOD

Brighter screen, plenty of memory, lots of expansion potential.

BAD

Time to retire the low-res screen already.

VERDICT

A slim, stylish, and powerful handheld.



Palm m515 A bright new update

Palm's new m515 is a replacement for the high-end, slimline m505. The new handheld addresses the biggest complaint about the earlier Palm—it's dim screen—and it doubles the memory as an added bonus.

The m515's screen has three screen lighting settings: off, low, and high. The low setting is slightly brighter than the m505 screen, while the high setting is dramatically brighter. The m515 screen boasts slightly richer color than our m505 as well. The Graffiti writing area is no longer backlit, however. Battery life at the low lighting level is the same as the m505—about two weeks of average use. At high level, expect a little over half as much duration between charges. Screen resolution remains unchanged at 160x160 pixels.

Memory has been doubled over the m505, to 16MB. You'll appreciate this extra RAM if you're using lots of older apps that don't understand Palm's VFS external memory support, or if a Bluetooth or other card in the SD slot is precluding addition of extra memory there. The m515 uses Palm OS 4.1, which offers some bug fixes over OS 4.0, but

no new features.

Along with the thinnest color form factor, the m515's competitive selling point is expansion potential. There are a number of add-ons available for the Universal Connector, and SDIO cards are starting to appear as well.

The m515 includes a useful software bundle, including Documents to Go and MGI PhotoSuite Mobile Edition. Overall, it's a nice refresh of the m505 design, but it's definitely evolutionary, not revolutionary.

—Denny Atkin



The m515 offers double the memory and a brighter screen.

CONTACT

Palm
www.palm.com
Price: \$279

GOOD

Good screen; compact; lots of expansion potential.

BAD

As cheap as memory is, 16MB would have been nice; slow screen refresh.

VERDICT

Expansion and color at an entry-level price.



Palm m130 color for the masses

Calling the m130 a "low-end" handheld isn't giving it enough credit. In the performance department, this little organizer can hold its own against the m505 and the Handspring Visor Prism, yet it costs just \$279.

The m130 closely resembles the m125, but it offers a rechargeable battery and a 16-bit color screen. Although it still sports only a 160x160-pixel resolution, the screen looks sharper than the m515's, thanks to its smaller size, which reduces the space between pixels. Unlike the side-lit reflective screens used on the m505/515 and color Clie models, the m130's backlit screen dims out quite a bit in direct sunlight. It's still more readable outside than the Palm IIIc or Visor Prism, which use a similar screen technology. The screen refresh rate is a bit slow, resulting in blurriness in action games like Zap!2016.

Powered by a 33MHz DragonballVZ processor, 8MB of memory, and Palm OS 4.1, the m130 can run with the fastest Palm handhelds currently available. It includes the same Universal Connector HotSync port and SD card expansion slot as the m500 series, and it can use virtually all of the add-ons for

those models.

It lacks the m505's vibrating alarm, however. Even more egregious, it has no charging light. The m130's excellent flip cover makes it easily pocketable, and it can use all the snap-on designer m100 faceplates.

The usual beefy Palm software bundle, including Documents to Go, MGI PhotoSuite, and MultiMail SE, is included. Compact and speedy, the m130 is an excellent alternative for those looking for a full-power, color handheld at a low price.

—Denny Atkin



The m130 is the least expensive color handheld available.

Memory Stick Camera Module

Straight from 007's gadget box

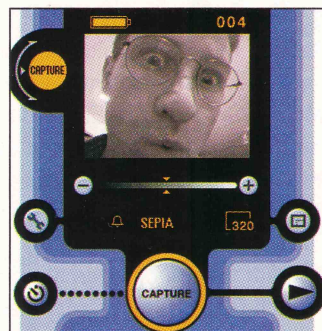
Sony's Memory Stick Camera turns your handheld into a poor man's digital camera. And not so poor at that; it's a much better product than we expected, given its maximum resolution of just 320x240 pixels.

A bit longer than a standard Memory Stick, the module is topped by a small silver tube that houses the lens. The tube can rotate about 270 degrees, thus allowing you to shoot your own mug as well as other subjects. Sony's slick, simplistic MS Cam software offers automatic and manual white-balance settings and can apply a handful of special effects (such as sepia and solarize). Photos can be viewed within MS Cam, Sony's PictureGear Pocket application, or the bundled Clie Paint program (great for annotating or doodling on your pics). You can also transfer internally stored photos to a Memory Stick—crucial given that each 320x240 shot nabs about 160K. (It's too bad the MS Camera has no memory of its own.)

Though it won't take the place of any halfway decent digital camera, the MS Camera snaps reasonably good pictures that seem well-suited to viewing on the Clie's screen. Thus, use it to take a few last-minute shots

of the family before you leave for your next business trip, or to throw together a quick inventory showcase before your next sales call.

Indeed, though far from cutting edge, the MS Camera offers a great solution for Clie users who want a quick and easy way to create and carry a photo library.



The Memory Stick Camera's preview window.

CONTACT

Sony
www.sony.com
Requires: Sony Clie PEG-N710C/N760C, PEG-T415/T615C
Size: 311K (MS Cam), 250K (Clie Paint)
Price: \$149.99

GOOD

Tiny; rotating lens; slick software.

BAD

Low resolution; no added memory; small onscreen preview window.

VERDICT

Overpriced and underpowered, but still a cool accessory with some practical value.



PalmPix Camera for the m500 Series

Think of it as a portable webcam

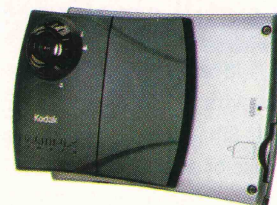
Don't think of the PalmPix Camera for the m500 Series as a cheaper alternative to a real digital camera. Its images aren't sharp enough for that. Rather, consider it a fun and extremely compact snapshot tool, small enough that you can have it around at all times to grab those opportune shots.

This snap-on digital camera is more versatile than the name implies, as it also fits the m125/130 and the i705. The 140K driver isn't built into the camera; it must be installed via HotSync. When detached, the PalmPix folds in half and easily fits in a pants pocket.

Image quality is decent in bright, outdoor situations, but declines rapidly in dimmer room lighting. Snapshots have a somewhat indistinct appearance, similar to those taken with a web cam. You can shoot in 320x240, 640x480, or 800x600 resolutions. A focus dial lets you take macro shots—great for capturing business cards. Images can be copied or moved to an expansion card, and can even be optionally (and slowly) converted to JPEG right on your Palm.

The live preview window you use to frame shots displays a mostly monochrome image, even on color handhelds. There's a slight delay between pressing the application button to take the image and when the camera shoots, making action shots very difficult to grab. Images viewed on your handheld look somewhat murky—they look much better on your computer.

The camera's HotSync conduit supports Windows and Macintosh, converting files to JPEG or BMP format automatically during transfer.



The PalmPix snaps onto the back of your handheld.



The PalmPix works best for outdoor snapshots.

CONTACT

Kodak
www.kodak.com
Requires: Palm with Universal Connector (m125/130/500/505/515, or i715)
Price: \$129.99

GOOD

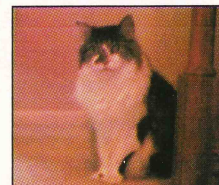
Very small, no batteries necessary, memory card support.

BAD

Poor low-light pictures.

VERDICT

A good companion to a real digital camera.



Pictures in low-light situations don't come out well.

CONTACT

Sony
www.sony.com/clié
Requires: Windows 98 or newer
Price: 199.99

GOOD

Speedy, lots of memory, great backlight.

BAD

USB cable doesn't charge, no cradle.

VERDICT

An entry level handheld you won't quickly outgrow.



Sony Clié PEG-S360

An entry-level powerhouse

Sony's PEG-S360 is a lot of handheld computer for under \$200. Like the S320 it replaces, this 33MHz device runs Palm OS 4.0 and boasts a Memory Stick slot for further expansion, but its internal memory has been doubled to 16MB. Why is this a big deal when you can add a 128MB Memory Stick? Because many older Palm OS programs are difficult to install completely in expansion memory without the use of external utilities. Also, programs launch faster from internal memory.

The S320 uses a low-res 160x160 monochrome screen, but with the "old style" full backlighting that's much easier on the eyes than the reversed backlight found on current B&W Palm and Handspring models. Like other Clié models, the S360 includes a jog dial for one-handed navigation. Unlike the newest Clié designs, though, the handy "back" button is missing here.

To keep the price down, Sony omits the cradle here, including a USB HotSync cable and travel charger instead. While this combination is actually

better than a cradle for frequent travelers who connect their Clié to a laptop, it's somewhat inconvenient in that the cable doesn't charge the handheld. This makes charging a more "conscious" effort. We'd suggest picking up a cradle or the excellent USB charging cable that's available from shop.brandoo.com.hk.

Bundled software includes Documents to Go 4.0, as well as picture and animation viewers. While it lacks the hi-res we love so much on other Clié models, this is nevertheless an excellent organizer for the price.

—Denny Atkin



Sony's slim entry-level Clié boasts 16MB of memory.

CONTACT

store.kyocera-wireless.com/
Requires: Kyocera Smartphone 6035
Price: \$99

GOOD

A no-compromise, full-sized keyboard that folds into a travel case.

BAD

Too big, and late. With cradle the case won't fit a pocket.

VERDICT

Easily the best keyboard for this phone. The combination replaces a laptop for many uses.



Kyocera Smartphone Portable Keyboard

It's still smaller than a laptop

Kyocera took a long time to reach a partnership with Think Outside to bring a folding keyboard to its Smartphone, and it made the unfortunate choice of adding a cradle rather than engineering a solution that connects the phone directly to the keyboard. But the result is still an excellent solution for users who write on the road. With the keyboard, the Smartphone can replace a laptop, at a third the weight of the slimmest sub-notebook.

The Stowaway keyboard design is well-known by now, but still draws stares. Unfolded, it is as big and springy as any laptop's. The tri-fold hinges, a justly honored feat of industrial design, collapse in seconds into a neoprene case sized like two decks of cards side by side.

Trouble is, Kyocera's case looks to be pregnant ñ it's just over twice the thickness of Think Outside's usual package, as the Kyocera model requires a separate folding stand. That adds 3 oz and more than an inch of thickness to the stowed keyboard. The stand is nicely designed, and no great burden to

attach, but the package no longer fits a pocket.

Today's Smartphone is late in its product life (typically 18 months for a cell phone), and Kyocera is mum about a rumored color successor. Unlike Palm, which introduced a Universal Connector with recent models, Kyocera does not guarantee that this keyboard will fit its next Smartphone.

The keyboard cannot be used during a data connection, but most users will want to read and write email offline. The keyboard works fine with the speakerphone on a voice call.

—Barton Gellman



Kyocera Smartphone Portable Keyboard.

MegaLauncher 3.2 A GUI to write home about

With the advent of color screens, memory expansion cards, jog wheels and other innovations, it's never been more crucial that you find a capable launcher for your handheld. For color-model Sony Clie users in particular, there's no better choice than MegaLauncher 3.2, a phenomenally versatile and attractive Palm OS interface. And even if you're not a Clie user, MegaLauncher still has plenty to offer.

The interface is a tweaker's dream, allowing you to display your choice of date, time, battery voltage, free memory, and half a dozen other options at the top of the screen. Better still, MegaLauncher serves up no fewer than seven views for displaying your icons—including "beam," "info" and "trash." You can also tap and hold your stylus on any icon for a couple seconds to bring up detailed information (size, version, category, and so on) and perform any of the aforementioned functions. An optional tab-view makes it easy to sort your apps into categories. For the power user, MegaLauncher provides one-tap access to favorite-,

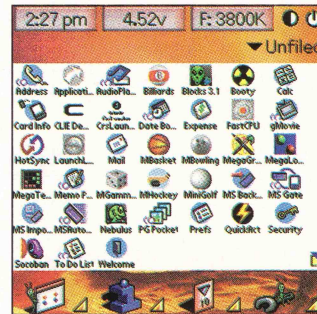
common-, and recent-apps lists. To top it all off, it includes cracker-jack support for memory cards.

If you're lucky enough to have a color Clie, you'll love MegaLauncher's support for skins (half a dozen were available at press

time) and small fonts and icons. The default skin looks disappointingly drab, but the extras add color and flair. They're great for grayscale models, too.

Color Clie users should buy MegaLauncher immediately, and everyone else should give it a close look. This is one launcher that's darn near perfect.

—Rick Broida



With hi-res support, you can see an impressive number of icons simultaneously.

CONTACT

Megasoft2000
www.megasoft2000.com
Requires: Palm OS 3.0
Version Tested: 3.2.2
Size: 198K
Price: \$20

GOOD

Excellent support for color, high-res, expansion cards.

BAD

It'll make you want to buy a Clie.

VERDICT

An absolutely stellar interface for your handheld PC.



MyScript Your own style of graffiti

Ever since the introduction of the Palm Pilot, developers have been building simpler replacements for the Graffiti input system. Graffiti is simple to learn, but it requires practice. Developers have tried everything from hardware keyboard add-ons to Graffiti replacements such as FitalyStamp. Vision Objects' MyScript falls somewhere in between. It does not replace Graffiti; instead it replaces your handheld's soft keyboard with a handwriting recognition text entry area. The idea is that you print naturally, a fast and intuitive method with no special alphabets to learn. You can even create profiles to help the program more effectively recognize your handwriting style. It works better than you might expect.

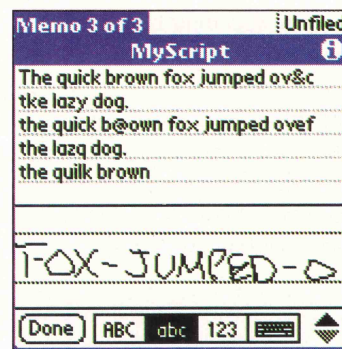
Unfortunately, it still doesn't work better than Graffiti. While Palm's default text entry system may require some memorization on your part, the special letterforms solve several problems inherent in handwriting recognition. For one, some letters (and numbers) look very similar. Do your Zs look like 2s? MyScript thinks so, too. Creating a user profile helps, but only a little, and you will proba-

bly have to change the way you write some letters and numbers to help distinguish them more clearly, and you must designate spaces as dashes between words. So much for natural handwriting.

Stroke recognition lags slightly behind your input, and if you write too quickly, the program often misses portions of your strokes. It works best when you write slowly and firmly; Graffiti is more resistant to hasty scribbling.

For all its problems, MyScript remains a solid concept. Its time is coming... but it has not yet arrived.

—Benjamin E. Sones



Even using personal profiles, recognition can be squirrely if you do not write slowly and firmly.

CONTACT

Vision Objects
www.visionobjects.com
Requires: Palm OS 3.0
Version Tested: 1.01
Size: 151K
Price: \$39.95

GOOD

Better results than you might expect from Palm-based handwriting recognition.

BAD

A quirky and relatively slow text entry system; still not a practical replacement for Graffiti.

VERDICT

Something like this will eventually replace Graffiti... but not today.



Quik Budget

Keeping your spending in line

CONTACT

Quik Sense Software
www.quiksense.com
Requires: Palm OS 3.0
Version Tested: 3.1.12
Size: 291K
Price: \$19.95

GOOD

Very easy to use, intuitive interface, plenty of options that are actually optional.

BAD

Lacks the functionality of a full-fledged account manager such as Pocket Quicken.

VERDICT

Simple enough to use that you will actually use it, Quik Budget is a great way to keep your spending in line.



There are numerous personal finance management programs out there. Some, like Quicken and Microsoft Money, are for your PC. Others, like AccountsMgr and BudgetMaster, work on your handheld. A few, like Pocket Quicken and SplashMoney work on your Palm but communicate with the personal finance management programs

that you keep on your PC. All of these programs are ineffective if you fail to keep them up to date, and let's face it—who really enters all their receipts into Quicken on a daily basis?

If you do, stop reading. Quik Budget is not for you. But if you are the sort of person that longs to monitor spending but need a simpler way to do it, you are in luck. Quik Budget lives up to its name. It is a simple budget-tracking program, and it takes very little time to learn and use. It will not balance your checkbook or track your bills for you, so it is not a replacement for programs such as Quicken. Instead, it allows you to set up a paycheck-by-paycheck budget for discretionary spending and keep a running total of how much you have left in any number of user-defined categories. If you want to set aside \$500 from each of your weekly paychecks as spending money, just tell Quik Budget to add \$500 to your budget every payday. Then you can break your spending down into categories. Perhaps you want to earmark \$100 for groceries, and \$30 for gas, and \$200 for entertainment (it's good to keep your priorities straight). Just enter the categories, and you are set to go.

Whenever you spend money, just tap on the appropriate category and enter the amount. You can also enter a description and indicate how you paid for the purchase, and Quik Budget can automatically calculate tax and tips. All of that is

Wallet ▼ All		
Name	Budget	Remain
*Savings	0.00	0.00
Dining	150.00	106.35
Gas	50.00	35.41
Groceries	200.00	175.18
House Stuff	400.00	195.11
Furniture		
Supplies		
Tools		
Miscellaneous	150.00	11.24
Total:	950.00	523.29
List	Expenses	Payday New

The main screen lists how much money you have left in each of your budget categories until your next paycheck.

New Expense ▼ House Stuff	
House Stuff	291.21
Comment: Rugs	
Spend: \$	96.10
Tax: ▼ 8.00 %	
= 7.12	
Account: ▼ Cash	
Done	Details... Cancel

Entering transactions is as easy as typing in a number.

optional, however. If you're in a hurry, just type in an amount. Quik Budget then deducts the amount from the appropriate category. The main screen lists how much is budgeted and how much is remaining in each category. If you want to look over (and edit) past transactions for a category, you can do that too.

You can also get fancy with your budget management, if you have the inclination. You can set each category to dump any unspent money at the end of each pay period into another category—perhaps Savings, if you are the responsible type. (Or Entertainment, if you aren't.) You can set up different types of sub-categories to track purchases in greater detail. You can configure it to work in tandem with any Palm OS personal finance manager that supports the Financial Posting Interface (such as PocketMoney and SplashMoney). Any entry you make in Quik Budget is automatically added to that program as well. You can also install it on your spouse's handheld and synch transactions via beaming.

Or you can opt to ignore all that and stick to the basics. That's where Quik Budget really shines. As a means of setting a budget for your spending and sticking to it, Quik Budget is simple and genuinely useful.

—Benjamin E. Sones

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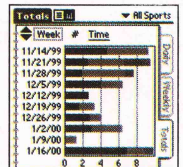
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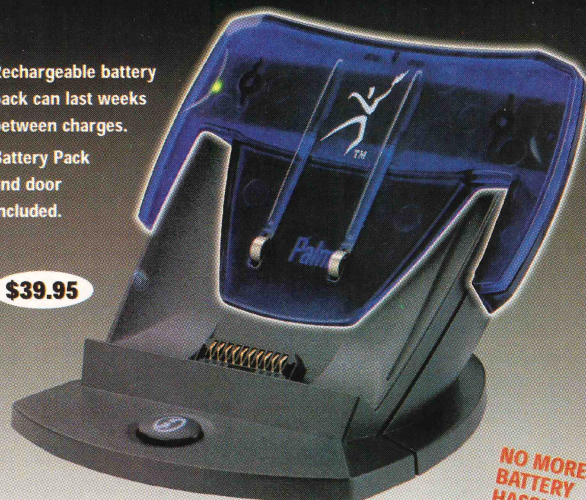
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PALM 101

THE FAQ FILES

Resets, Errors, Alarms, and More

by Calvin O. Parker

This month we dig through the mailbag and address a number of the common questions we've received lately.

In each issue, Palm FAQ-master Calvin O. Parker answers questions large and small, simple and technical. Send yours to calvin@hhcmag.com

I don't know what I did, but now when I turn my handheld on (or even reset it!) I get a "Fatal Exception" error... Help!

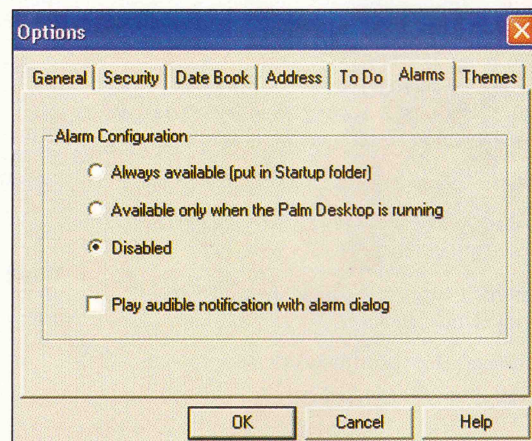
Try this: Reset your device while holding the "Up" button. This will do a reset, but won't do a lot of things normally done at reset time (including loading the errant application/database on your handheld). Once you do this, you should be able to delete the last application you installed, and then perform another reset to see if the problem is cleared up. If it isn't, keep repeating the reset with the up button, removing any relatively new applications until you can get a successful "standard" reset.

If you can't find the application or database causing the problem, hopefully you've recently performed a HotSync operation. If so, then you need to wipe your device by doing a hard reset (pressing and holding the power button while resetting, letting go when you see the reset logo, then choosing "Yes" when it asks you whether to erase all data) and do this: Go to your computer and move all of the files from the backup directory (usually C:\Palm\yourusernameBackup) to another directory on your computer. Now, do a HotSync operation. This will put only the built-in applications data back on your device. Now, go to where you copied your backup directory, and a few files at a time (I normally choose 10), install these just as you would a normal application or data file. Eventually you'll either have found the application that causes the error, or you will have restored everything and cleared up your problem.

Note that reset crashes are sometimes related to the "saved_preferences.prc" file, which can't be deleted on your handheld, but can be removed from the Backup directory on your desktop computer before you do a hard reset and restore operation. However, if you delete this file, you'll have to re-enter the registration information for any programs you've purchased.

A buddy of mine has Palm Desktop and when he sets alarms, they show up on his desktop as well as his handheld. How do I do that?

Only the latest versions of the Palm Desktop include this (version 4.x and higher). You can download the latest version of Palm Desktop from www.palm.com/support/downloads. Once you've installed the latest version, you can turn on Desktop alarms by going to the Tools Menu, selecting Options, then clicking on the Alarms tab.



If you're not getting alarms under Palm Desktop 4, change this setting to "Always Available."



Calvin's FAQ Files are brought to you by PalmGear.com. See Calvin's FAQ page online at www.palmgear.com/faq

I'm having problems with my handheld, and called Support. They told me I have to do a "hard reset," which wipes everything off my device. Is there any way around this?

Sometimes you can avoid this, but the reason this is done is to determine right up front if your problem is hardware- or software-related. If wiping all the data and applications off of your handheld doesn't clear up the problem, then it's probably hardware related. If it does, then something you loaded is causing the problem.

Also, removing all the applications and installing them back to the device a few at a time (as mentioned in the question above) is really the quickest way to isolate an application or database that might be causing the problem.

The good news is that if you regularly perform a HotSync operation and you're running HotSync Manager 3.0.4 or later, all of your applications and data will be backed up on your computer, and will be restored after a hard reset once you HotSync.

I am moving from a Visor to a different brand PDA, but I really like the calculator that comes with the Visor! Can I get this on my new handheld?

Almost. The calculator that is on the Handspring devices is a watered-down version of a shareware calculator called "Parens." You can get the full version, which looks a lot like the calculator on your Visor, and install it on your new handheld. For more information, see www.radiks.net/~rhuebner/parens.html.

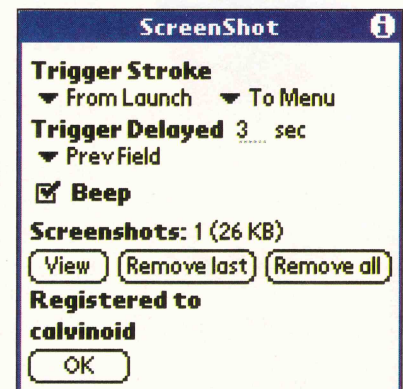
Is there was a way to redefine the hardware buttons on a handheld (I have Handspring Visor Deluxe), so that it opens a different application than the factory default DateBook, etc? I have downloaded far better replacement applications for most of these, and I want to be able to launch them quickly.

This is an easy one! Go to the Prefs application, then select Buttons (tap the upper right corner of the screen to display all the Prefs options). Choose the button you want to change, and tap the list next to it to select a different application. This is the same place you can re-assign the silkscreened Calculator button (or Favorites button on a i705), as well as the default bottom-to-the-top-of-the-screen "quick launch" pen stroke.

I'd like to get a screen shot for a document I'm working on. How do you guys do that?

There are several ways to do this. The easiest is to use something that captures the screen on your handheld, and then transfers to your desktop at your next HotSync operation. If you're looking for a screen shot program, I'd recommend ScreenShotHack (www.linkesoft.com). If you'd also like a nice paint program that also captures screens, check out TealPaint (www.tealpoint.com).

Another method would be to load POSE (the Palm OS Emulator) on your desktop computer, and then use that application's "Save Screen" function to capture that program's screen on your computer. Get it from www.palmsource.com.



Capture screenshots on your handheld with ScreenShotHack by LinkeSoft.

Rick Broida Vs. Dave Johnson

Smart? Phones



What do you think?

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RICK: Funny. Sony's first Clie was a colossal disappointment, but now I'm head over heels for my N760C. The first Palm OS-based smartphone was a total bomb, but now I wouldn't be caught dead without my Kyocera Wireless QCP-6035. Alas, I usually wind up toting both devices, because I love the phone but prefer the Clie's high-resolution color screen for word processing, games, etc. Will we ever have a smartphone that offers the best of all worlds?

DAVE: That's just plain wacky. What exactly is the point of carrying the gargantuan Kyocera Smartphone—which is oversized precisely because it's also a Palm—if you're also going to tote around a Clie? That's like eating a bowl of cereal along with your hamburger because you overslept and missed breakfast. Personally, I think you have the wrong smartphone. I've found the Treo is just about perfect, and you can fit ten Treos in the space of just one Kyocera.

RICK: Gee, it's not like you to grossly over-exaggerate something. The Kyocera is marginally larger than the Treo, but it still fits easily in a coat pocket and feels comfortable in my hand. As always, you insist that what's right for you is right for everyone. Granted, I haven't played much with the Treo, but I definitely don't like the keyboard-based model. Give me Graffiti or give me death. Maybe the BlackBerry crowd will like the keyboard, but not Palm OS diehards like me.

DAVE: Well, with those tree trunks for fingers, it would be a miracle if you could even operate one of those oversized phones they put in science museums. But that's what's so great about the Treo: it's available with either a BlackBerry-style keyboard or Graffiti, so you can buy the model that works best for you. Indeed, after using the keyboard version for a month or so, I believe I prefer Graffiti too. The

only thing the Treo lacks is an expansion slot. Why do all these smartphones cut corners on peripheral expansion? None of them have any memory or device slots, and the few peripherals that do exist are pretty clumsy. Take the Stowaway keyboard for the Kyocera, for instance—what's up with that?

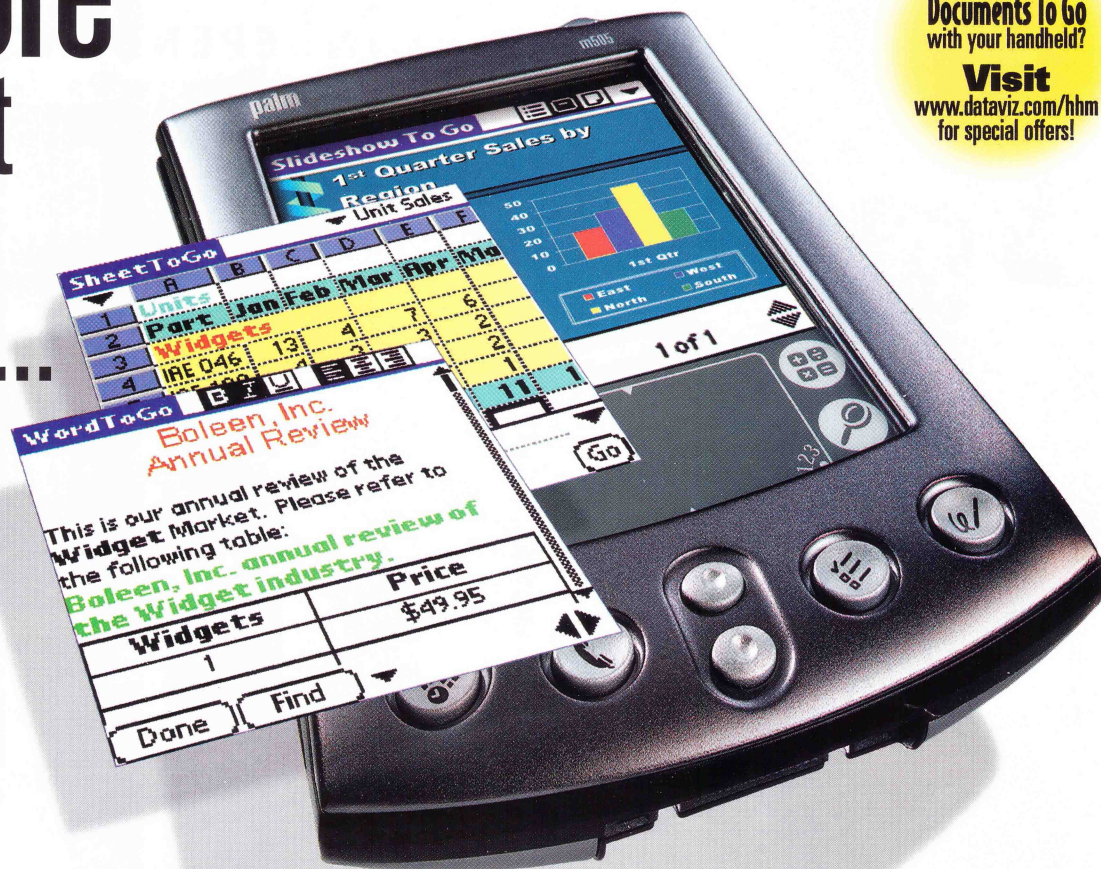
RICK: It's still the same great Stowaway keyboard—just with an inconvenient separate cradle. But you're getting off the point, as usual. I'm sold on the smartphone concept—a Web- and e-mail-enabled phone built around the Palm OS. The Kyocera rocks, and today you can buy it from Sprint PCS for just \$49 (after a \$100 rebate, which, alas, will have expired by the time this reaches readers). That's a shockingly good deal on a truly outstanding phone. The Samsung I300 has a color screen and smaller form factor, but the screen looks fuzzy and I find its interface less intuitive. As for the Treo, I'll need to see the Graffiti-based color version before I render a verdict. Right now, it just seems, well, uninspired.

DAVE: Thanks, Mr. Ebert, for your entirely unsolicited review of smartphones. Regardless of your Treo-bashing, I think people will flock to Handspring's smartphone in droves, despite the fact that no one actually knows what a "drove" is. Why? Because Handspring is offering users a real choice. Keyboard or no keyboard. Color or grayscale. Plus, it comes with 16MB of RAM. In one sense, it's the best PDA money can buy, at least until OS 5 and dramatically faster processors come along.

RICK: I say the Treo is "uninspired" and suddenly I'm "bashing" it? Okay, Mr. Sensitive—guess I better not knock your beloved Enterprise (the lamest Star Trek show ever). Anyway, time will tell if the Treo scores with customers—I predict a modest hit at best. Forthcoming smartphones like the Danger Hiptop and Nokia Communicator show a lot more innovation, and will probably be bigger hits with smartphone buyers. Save for the BlackBerry-like keyboard, where does the Treo innovate, really?

DAVE: I must be arguing with Rick's evil twin. Danger? Nokia? Come on, dude, have you seen those devices? Danger's Hiptop looks like a college art class project run amok, and I could beat a water buffalo to death with Nokia's new smartphone—not that I'd want to, of course. The Treo is the perfect combination of familiar features and carefully measured innovation. Just the sort of thing I would have thought you'd appreciate, unless you're really evil. I ought to go alert Knight Rider just in case.

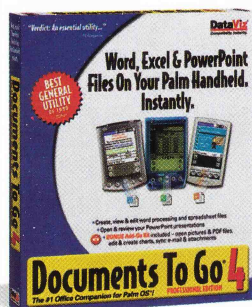
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